An Analysis of the Potential for Redirection of the Rocky Flats Environmental Restoration Program

Strategic Planning Initiative, Review, and Implementation Team

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Preliminary Draft for Discussion Purposes Only

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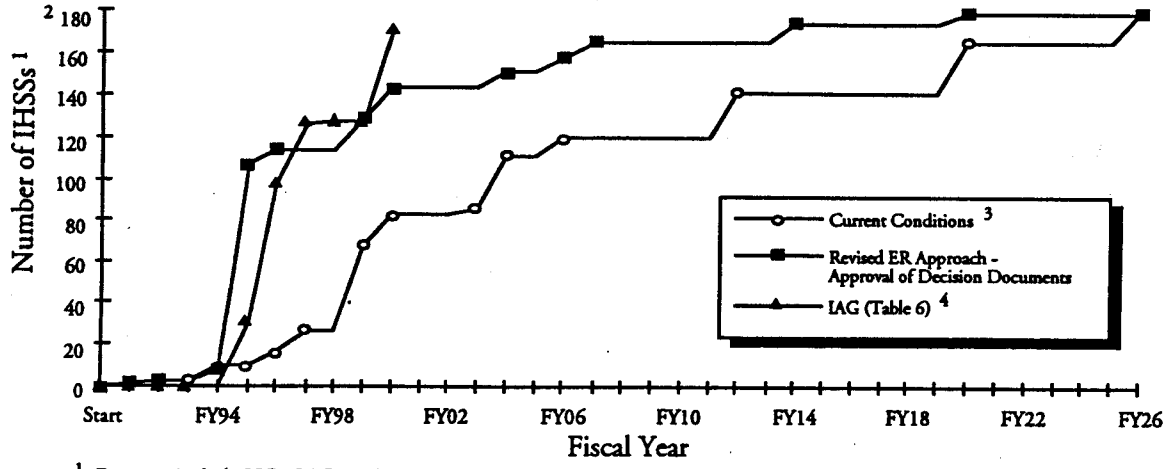
AGM	Associate General Manager
ARAR	Applicable or Relevant and Appropriate Requirement
CAD	Corrective Action Decision
CAMU	Corrective Action Management Unit
CDH	Colorado Department of Health
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMS	Corrective Measures Study
CSTP	Conceptual Site Treatment Plan
cu. yds.	cubic yards
CWSF	Central Waste Storage Facility
D&D	decontamination and decommissioning
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOE-HQ	DOE Headquarters
DOE-RFO	DOE Rocky Flats Office
DOI	Department of the Interior
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ER	Environmental Restoration
FFA	Federal Facilities Agreement
FFS	Focused Feasibility Study
FS	Feasibility Study
FY	fiscal year
HAZ	Hazardous Waste
HPGe	High Purity Germanium
HVO	hazardous - volatile only
IA	Industrial Area
IAG	Interagency Agreement
IDM	Investigatory-Derived Material
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remedial Action
IPP	Integrated Planning Process
LDR	Land Disposal Restrictions
LFI	Limited Field Investigation
LL	low-level
LLM	low-level mixed
MW	Mixed Waste (radioactive and hazardous components)
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NFA	No Further Action
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NTS	Nevada Test Site
O/IRAP	Optimum Interim Remedial Action Plan

O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Act
OTD	Office of Technology Development
OU	operable unit
PA	Protected Area
PAC	Potential Areas of Concern
PCB	polychlorinated biphenyl
PEA	Potential Early Action
PIC	Potential Incidents of Concern
PPM	parts per million
QAT	Quality Action Team
RAD	radioactive
RCRA	Resource Conservation and Recovery Act
RFP	Rocky Flats Plant
RI	Remedial Investigation
RFI	Remedial Facility Investigation
RMA	Rocky Mountain Arsenal
ROD	Record of Decision
SACM	Superfund Accelerated Cleanup Model
SAFER	Streamlined Approach for Environmental Restoration
SAR	Safety Analysis Report
SNM	Special Nuclear Material
SOP	Standard Operating Procedure
SPIRIT	Strategic Planning, Initiative, Review, and Implementation Team
sq. yds.	square yards
SWEIS	Sitewide Environmental Impact Statement
TRU	transuranic
TSCA	Toxic Substances Control Act
UBC	Under Building Contamination
WAC	waste acceptance criteria

1.0 EXECUTIVE SUMMARY

This analysis of the U.S. Department of Energy (DOE) Rocky Flats Plant (RFP) Environmental Restoration (ER) Program documents a strategy to accelerate cleanup. It includes many activities currently being implemented and identifies issues still needing resolution. The conclusions indicate that the potential exists to revise the approach to achieve substantial cost and schedule acceleration (as shown in Figure 1.1) along with concurrent cost efficiencies. Further, it can be accomplished without compromising the protection of either human health or the environment.

The revised ER approach, described by this document, is proposed as the primary basis for modifying the current ER Program at RFP. It stresses the use of current regulatory initiatives and recent technical and procedural innovations that were intended to make environmental cleanup more efficient. The revised ER approach also emphasizes the use of current data to conduct accelerated interim cleanup of selected Individual Hazardous Substance Sites (IHSSs) (or portions of IHSSs) as an augmentation to the current Interagency Agreement (IAG) approach which defers remedial action until the completion of the Remedial Investigation (RI)/Feasibility Study (FS).



[1] Does not include PICs, PACs, or UBCs (See Section 2.2 for details).
[2] Includes four Pre-1993 IM/IRA Decision Documents.
[3] Current Conditions are based on FY95-FY99 EM-40 Baseline Document (Five-Year Plan).
[4] All RODs under the IAG were scheduled to be completed by FY2000. Milestones for ROD completions for OUs 3, 5, 6, 8, 12, 13, and 14 were not included in the IAG (Table 6) because of scope uncertainty.

Figure 1.1
IHSS Decision Documents/Records of Decision

1.1 Current Status of Rocky Flats ER Program

The RFP ER Program comprises 177[1] IHSSs grouped into 16 Operable Units (OUs). The IAG, which prescribes the extent and time frames for cleanup of these 16 OUs, was

[1] As a result of various combinations, expansions, and redesignations, the original number of active IHSSs (178) now totals 177.

signed in 1991. At that time, the work scope was ill-defined which resulted in a great deal of uncertainty about the resources and schedule requirements necessary to meet the commitments of the IAG. In addition, there has been a steady expansion of the work scope and the documentation required to execute the program, offset by little or no modification to the official IAG schedules. This situation has been compounded by the unavailability of additional funds to perform the increased work scope, and difficulties in acquiring and efficiently using the large increase in environmental personnel required to execute the IAG. Consequently, the ER Program is behind schedule and has begun to miss milestones. Because the remaining effort cannot be effectively compressed, there is no prospect of returning to the IAG schedule.

In order to come as close as possible to achieving the IAG commitments, RFP has taken the following actions: (1) placing funding priority on the highest risk OUs, (2) deferring intrusive characterization and planned cleanup for six OUs in the Industrial Area (IA) until Transition and/or Decontamination and Decommissioning (D&D) activities are initiated, and (3) taking a number of procedural and organizational actions to increase efficiency. The resulting program is consistent with the Five-Year Plan[2] funding target levels provided, but does not address the difficulty of meeting the IAG commitments. Furthermore, it leaves a number of other major issues that currently impact or will impact the ER Program and the IAG unresolved. These issues include the following:

- Increasing desire by many stakeholders to improve the efficiency of the cleanup process
- Funding requirements in years beyond the Five-Year Plan window which exceed funding availability
- The need to modify the IAG to reflect realistic goals
- The undetermined future land use which may result in overly-conservative cleanup- level requirements
- The dependency of the ER Program on waste disposal/storage availability

Each issue is discussed in more detail in the following sections.

The difficulties associated with the Congressional funding cycles, regulatory redirection, remediation schedule deadlines, and a mixed waste (MW) repository are not unique to RFP. These problems are encountered across the entire DOE complex. RFP has taken a number of ongoing improvement efforts in an attempt to resolve or mitigate these problems and other IAG-related issues. These efforts include a multi-agency Quality Action Team (QAT) comprised of key managers from the DOE Rocky Flats Office (DOE-RFO), Colorado Department of Health (CDH), Environmental Protection Agency (EPA) Region VIII, and EG&G. The QAT was established in the fall of 1992 with the charter of identifying issues that adversely affect the ability to perform ER activities at RFP and developing process improvement recommendations for senior management review. Details are presented in Section 2.3 and Appendix A.

Notwithstanding the above, RFP management saw the need for developing a revised ER Program. The objective of the revised ER approach is to identify an initiative that would

[2] The Five-Year Plan is from the FY95-FY99 EM-40 Baseline Document.

accelerate the cleanup process and reduce costs without compromising either protection of human health or the environment. A special analysis with that objective was initiated in June 1993 using a team that included DOE (Headquarters [DOE-HQ] and RFO), EG&G personnel, and experts from nationally recognized ER firms. The analysis relied on recent regulatory and process innovations such as DOE's Streamlined Approach For Environmental Restoration (SAFER), and EPA's Superfund Accelerated Cleanup Model (SACM) and Corrective Action Management Units (CAMU). While the CAMU approach is not currently allowed by the State of Colorado, it is widely recognized as a cost-effective and reasonable method for cleanup. The analysis also incorporated other ongoing improvement efforts initiated by RFP which are discussed in Section 2.3. It concluded that a revised ER approach could provide more effective results and comes much closer to meeting the IAG schedule (as shown in Figure 1.1).

1.2 Revised Approach to the Rocky Flats ER Program

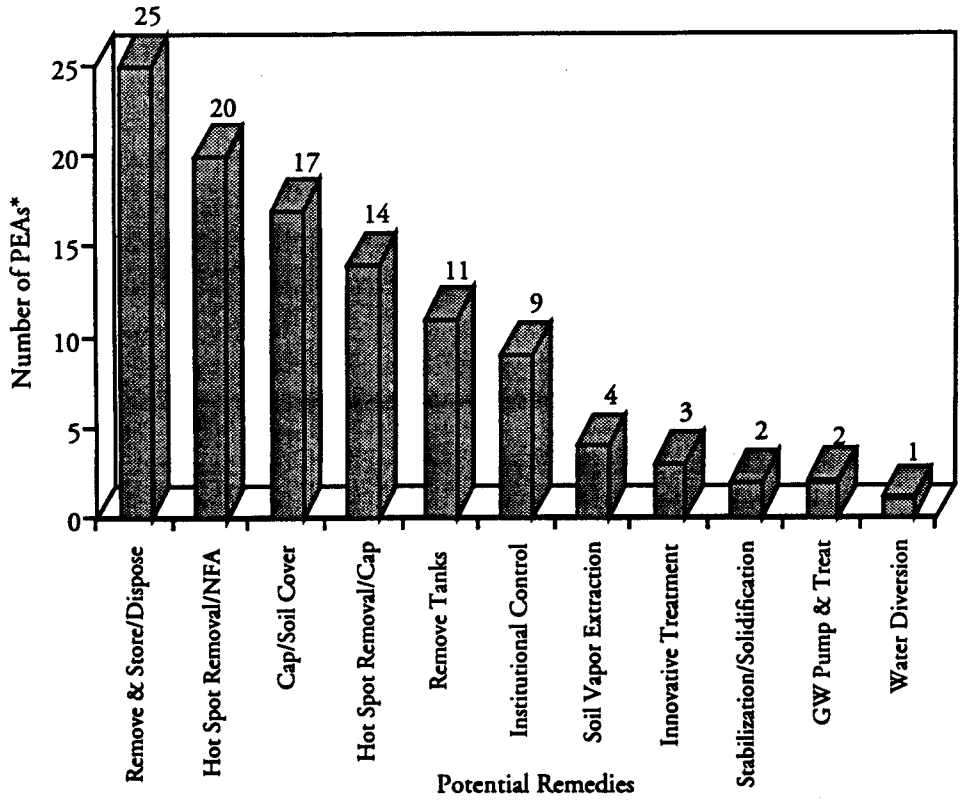
Under the current IAG, remedial action is not typically initiated until completion of the RI/FS process and approval of a Decision Document (either a Comprehensive Environmental Response, Compensation and Liability Act [CERCLA] Record of Decision [ROD] or Resource Conservation and Recovery Act [RCRA]/Corrective Action Decision [CAD]) for an entire OU. The results of this analysis indicate that remediation of as much as 40 percent of RFP's 177 IHSSs could be accelerated within the current Five-Year Plan funding profile. This could be achieved by using Interim Measure/Interim Remedial Action (IM/IRA)[3] Decision Documents for an individual IHSS (or a group of similar IHSSs) and initiating remedial action without waiting for completion of a ROD/CAD that covers the entire OU. To enhance efficiency, the revised ER approach envisions approval of generic IM/IRAs with established standards and procedures for entire classes of remedial actions such as removal of "hot spots."[4]

The two basic premises for the proposed IM/IRAs are: initiating early remedial actions on IHSSs that have been sufficiently characterized (Figure 1.2), and pursuing No Further Action (NFA) recommendations for IHSSs in which the data indicate that contaminant levels are either non-existent or acceptable to warrant no further action. These two options can be pursued as soon as the data are adequate to support the recommendations. This determination may be done with current data or may require data acquisition under a Limited Field Investigation (LFI). In either case, pursuit of an early remedial action or an NFA would provide an effective schedule improvement over the OU RI/FS process.

The implementation of an IM/IRA would reduce the human health and environmental risk associated with IHSSs and could substantially reduce the risk assessment requirements of entire OUs. For example, if an IM/IRA included capping to reduce mobility or an accelerated removal, the result could be an overall reduction in the risk associated with that IHSS. This in turn would affect the overall risk associated with the OU. In essence, these actions constitute a risk management approach to site remediation. Additionally,

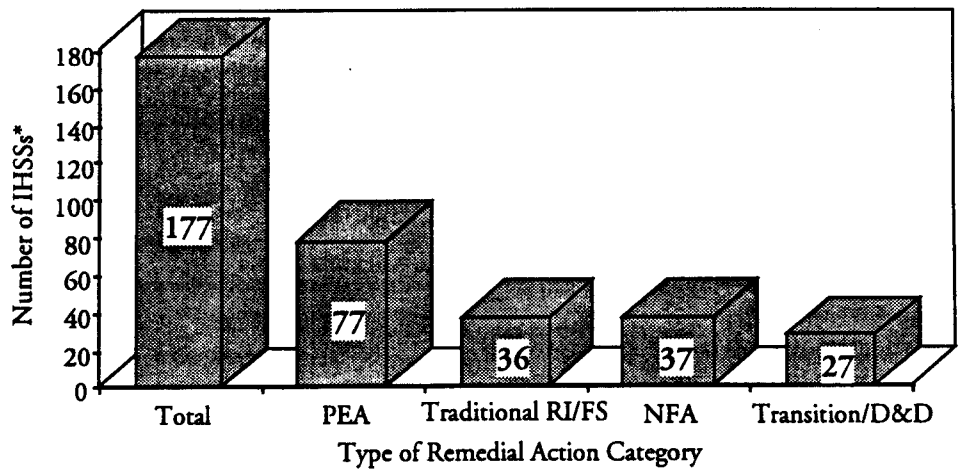
[3] The term IM/IRA is a combination of the RCRA term Interim Measure and CERCLA term Interim Remedial Action as defined by the IAG.

[4] See Table 4.3 for definition.



*Each Potential Early Action (PEA) may have multiple remedies

Figure 1.2
Potential Early Action Remedy Distribution



* Does not include PICs, PACs, and UBCs (See Section 2.2 for their definition)

Disposition Breakdown 3 Chart 1
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Figure 1.3
IHSS Distribution-Remedial Action Categories

the reduction in risk could also generate a corresponding reduction in the volume of material ultimately requiring treatment. Finally, initiating IM/IRAs could improve on the schedule and cost requirements for the remaining traditional RI/FS efforts by reducing the scope and complexity of the study. This could result in more efficient field investigations and fewer RI/FS reports. A proposal will be made to selectively regroup IHSSs into different OUs by remedial action type and/or location. This action is designed to improve the schedule for ROD determinations and the efficiency of executing remedial actions and field investigations.

Figure 1.4 shows preliminary estimates of annual funding requirements and the lifecycle funding costs for this revised ER approach. The key planning assumptions inherent in the development of these estimates include: (1) utilization of soil washing technologies as the primary soil treatment, with a corollary assumption that 80 percent of the contaminated soil could be returned onsite and 20 percent would be classified as waste, treated (if required, for example, by Land Disposal Restrictions [LDRs]), and transported for disposal, (2) utilization of existing soil characterization data in assessing the risk and candidacy of a particular IHSS for an early remedial action or for a determination that no further action is required, (3) selective removal and/or isolation of contaminated areas within specific IHSSs can significantly reduce risk and reduce previous estimates of soil volumes to be treated, (4) long-term, large-volume, interim bulk storage will be constructed and used while awaiting availability of offsite disposal, (5) LFIs will be performed to gather sufficient data on IHSSs that have not been adequately characterized to-date (primarily IHSSs in the IA that will not conflict with Transition/D&D activities). It is anticipated that this approach will accelerate the existing schedule for cleanup activities and reduce outyear (beyond FY2000) cost escalation. See Section 4.3 and Appendix F for a more detailed discussion of assumptions. In addition, detailed backup to these estimates is available for review (SPIRIT Reference Volumes I, II, and III).

The revised ER approach incorporates a number of ongoing, planned, and new actions into an integrated ER Program which could accelerate cleanup and execute the program in a more cost-effective manner. This approach provides a realistic funding profile that is targeted at early and continuous cleanup versus extensive studying prior to initiating remedial action. It should be the basis for modifying the IAG.

Although the revised ER approach allows accelerated interim cleanup of many IHSSs, the endpoint for completion of the total program, as defined by the IAG, would be unchanged from the current schedule. This is due to the fact that many IHSSs in and under buildings in the IA would be linked to outyear schedules (yet to be determined) for Transition/D&D. Notwithstanding the interim cleanup of IHSSs (or portions of IHSSs), closure of the 16 IAG OUs cannot occur until the completion of the RI/FS, the ROD, and the selected remedial action. The ultimate disposition of the RFP is not addressed by the IAG and would probably be determined through other mechanisms such as the National Environmental Policy Act (NEPA).

During the course of this analysis, several informal meetings were held with representatives of EPA Region VIII and CDH to discuss the revised ER approach and its expected benefits. The regulators were generally supportive of the approach under the following conditions: (1) remediation decision on each IHSS and OU would be subject to public

review and comment, (2) the ER Program budget would not be reduced to support other plant activities, and (3) the revised ER approach would include a parallel effort to streamline DOE orders and plant procedures. Examples of procedures which need streamlining include the requirements for Safety Analysis Reports (SARs) for low-risk facilities, NEPA requirements that overlap requirements of CERCLA, long lead times associated with implementation of activities at RFP, and lengthy review cycles by all parties.

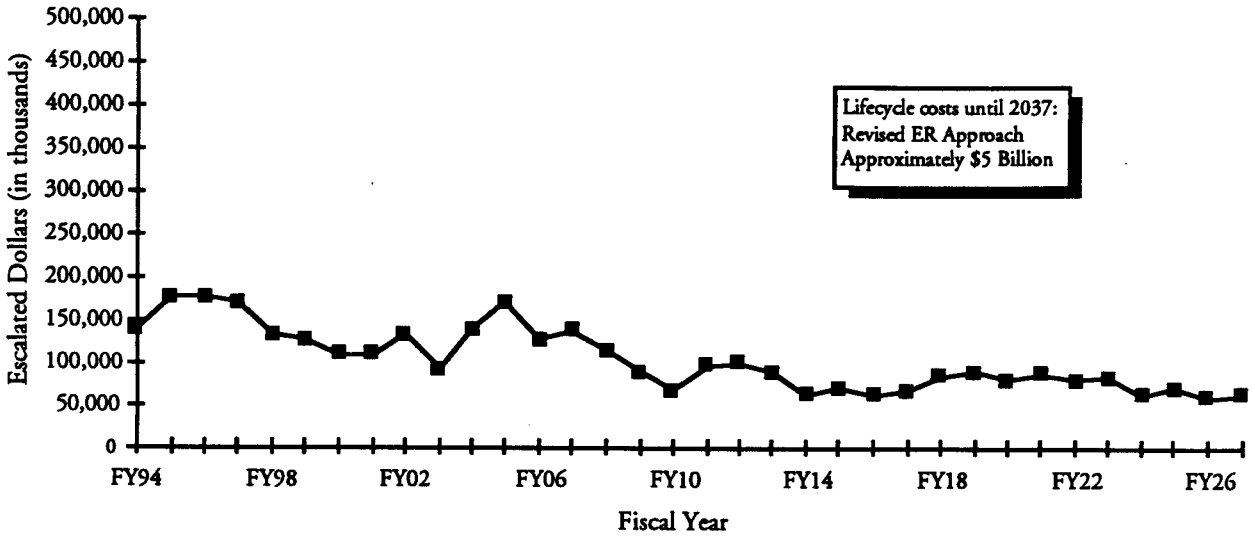


Figure 1.4
Revised ER Approach of Total Costs by Fiscal Year

1.3 Major Assumptions

There are a number of assumptions inherent to the revised ER approach. A detailed discussion of these assumptions is provided in Sections 1.4 and 5.0. Three of the most crucial assumptions include the following:

1. *RFP will be able to identify and provide timely interim waste storage capacity particularly for environmentally-contaminated media and low-level mixed (LLM) waste sufficient to support remediation and other scheduled waste generation activities.* This assumption is probably the most critical element of the entire ER Program, whether it is the current program or the revised ER approach.

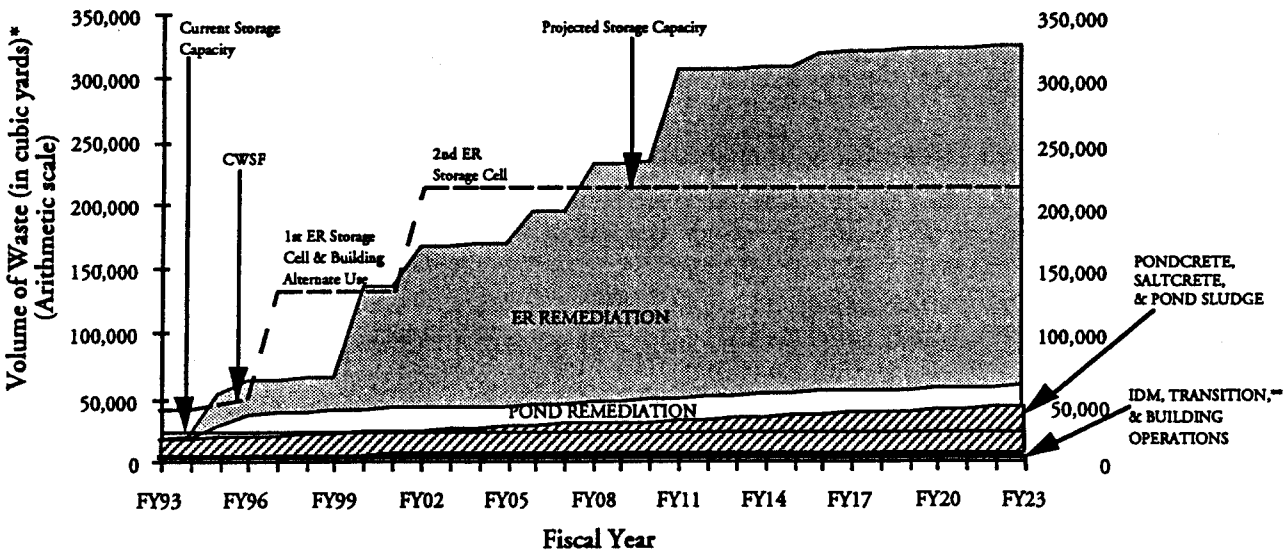
2. *Agreement can be reached with regulators that after completing a risk reducing early remedial action on an IHSS, the final OU-wide risk assessment will be based upon the post-removal conditions.*

3. *Agreement can be reached with regulators and the public that the risk levels after remedial actions will be generally consistent with reasonably anticipated future land use*

determinations that take into account normal land use planning factors such as topography, wetlands, flood plains, unique habitat, economic factors, and legal restrictions (i.e., mineral rights). A further discussion of land use is provided in Section 3.3.

If an offsite disposal facility for LLM waste does not become available soon, large-volume interim retrievable waste storage containers or cells will have to be permitted and constructed in time to support the ER Program schedule. Preliminary estimates of drummed remediation wastes (Figure 1.5) indicate that storage capacities of buildings and tents (either before or after treatment) will be inadequate. The currently-available storage space (some in need of permit modification) and the space to be added by the planned Central Waste Storage Facility (CWSF) would only support the interim storage of remediation waste generated in the first year or two of the revised ER approach. Moreover, the total of currently available and planned storage space is less than one-tenth of the capacity required for the complete site cleanup under the revised ER approach.

Clearly, there are cost, risk, and other tradeoffs between accelerating soil remediation and storing remedial waste until disposal is possible or deferring remediation until ultimate disposal is defined. The recent permit modification of Envirocare in Utah may allow RFP to ship LLM waste there for disposal and reduce or delay the need for construction of large-volume interim waste storage facilities at RFP. An intensive analysis of the total waste storage needs and capacity at RFP is required to develop cost options and determine the best course of action.



* Does not include any residue, D&D, or TRU waste
**Includes Phase I LLM residues (<1.5 g/l)

Figure 1.5
Low-Level Mixed Waste Generation and Capacity Projections
Projected Cumulative Generation and Storage Capacity

1.4 Conclusions and Recommendations

Since the signing of the IAG, several events have occurred that indicate that the approach to remediating the RFP site needs to be revisited. The ever expanding cost and schedule requirements for the cleanup effort, the mission change for the site, the efficiencies identified through increased knowledge, and the growing pressure for more accelerated, cost-effective cleanup has led DOE-RFO to conclude that a revised ER approach is needed. To achieve this objective, DOE-RFO approved action to examine RFP's ER Program, address pertinent issues, and develop a strategy to more efficiently perform cleanup activities. This revised ER approach includes the following:

- Initiating IM/IRAs to accelerate corrective action on IHSSs whose removal and/or isolation will substantially reduce risk
- Eliminating current operations for which results indicate that contamination is not significant and poses no risk to the public and environment (i.e., groundwater treatment at OU1)
- Deferring activities on IHSSs within the IA that pose no immediate risk to the public or environment, and should be integrated with Transition/D&D activities for technical and cost-effective reasons
- Fully integrating ER activities with waste management activities to allow efficient consideration and provision of interim storage capacity requirements
- Regrouping/consolidating IHSSs and OUs to improve the efficiency of program execution
- Modifying the IAG to reflect new milestones and a change control mechanism that allows flexibility in its commitments as increased knowledge and experience are obtained

In its current form, this revised ER approach is still a concept rather than a finished implementation plan. More detailed plans and estimates would be required to verify the schedule and cost projections and form a basis for formal commitments. However, there appears to be great potential for acceleration of the RFP cleanup if all parties take this opportunity to look strategically and build on the successes of the past to create a more effective future.

The following recommendations are made for continued pursuit of the revised ER approach described by this analysis:

DOE-HQ

- Endorse the revised ER approach as the planning basis for the RFP ER Program and IAG renegotiation
- Accelerate resolution of land use and waste disposal/interim storage issues
- Intensify ongoing efforts to streamline DOE orders for ER applicability

- Delegate local decision-making authority to RFP (e.g., for SARS)

DOE-RFO

- Initiate broad stakeholder involvement to generate support
- Reach agreement with regulatory agencies on the revised ER approach
- Refine the approach by developing implementation plans, schedules, and associated detailed cost estimates
- Develop waste disposal/storage cost options for the revised ER approach
- Assist in the resolution of land use and waste disposal/interim storage issues
- Intensify ongoing efforts to streamline RFP procedures for applicability to ER activities

2.0 CURRENT STATUS OF THE ENVIRONMENTAL RESTORATION PROGRAM

In March 1992, the historical mission of RFP, nuclear weapons production for defense, ended after 35 years. The current mission is to cleanup and convert the RFP to beneficial use in a manner that is safe, environmentally and socially responsible, secure, and cost-effective.

2.1 ER Program Background

ER activities began at RFP in 1984 under the Comprehensive Environmental Assessment and Response Program. A preliminary Site Assessment Report and the first IHSS list were completed in 1986. Schedules were developed in 1986 for the characterization program of the 881 Hillside (now OU1) and the 903 Pad (now OU2) in 1987. A sitewide characterization was performed in 1986 and updated in 1987. The RFP was named to the National Priority List (NPL) in the fall of 1989. Consequently, the IAG was negotiated among DOE, EPA, and CDH, in order to establish a common basis of understanding and to integrate the requirements of EPA and CDH. The IAG was signed on January 22, 1991. The IAG provides the legally enforceable framework to coordinate cleanup and oversight efforts and to standardize requirements at RFP. The IAG addresses 177 IHSSs, establishes specific milestones and time frames for the conduct of remediation, and stipulates penalties for noncompliance with the agreement.

2.2 Status of Compliance with the IAG

The IAG needs major schedule and procedural modifications. When the IAG was signed in 1991, there was insufficient knowledge by all parties of the total ER requirements for RFP and the associated time and resources necessary to meet those requirements. The framing of the IAG began in 1989 shortly after the Federal Bureau of Investigation raided RFP searching for environmental law violations. Under the prevailing circumstances, DOE had very little negotiating leverage. The IAG schedule was very restrictive, with most activities on the critical path. Since 1991, the scope of work has increased, the processes for accomplishing work at RFP have become more complex, additional funding has been unavailable to perform increased scopes of work, and there have been difficulties in acquiring and efficiently using the large increase in environmental personnel required to execute the IAG.

From the inception of the program through the second quarter of Fiscal Year 1993 (FY93), 88 IAG milestones have been met. A total of 66 milestones were met in accordance with the IAG schedule, and 22 milestones were met under extended completion dates. The majority of these extensions were granted without concurrent extensions of subsequent and dependent milestones for the same OU. The regulatory agencies have denied the extension request for two IAG milestones in OU2. The EPA has started the process of imposing stipulated penalties upon DOE (which could include fines of $5,000 the first week and $10,000 per week thereafter) for each missed milestone. A temporary work stoppage pending resolution of risk assessment issues effectively puts the IAG schedule for OUs 1 through 7 in abeyance. With the exception of OU4, IAG milestones scheduled in future fiscal years are probably not achievable. Fines paid as stipulated penalties to the regulatory agencies or to the U.S. Treasury

would be paid from available program funding and would diminish resources available for cleanup.

In their review of RFP's Historical Release Report (as of March 1993), the regulatory agencies identified 81 additional potential areas of concern (PACs), potential incidents of concern (PICs), or areas of under-building contamination (UBC) that are not included in the IAG. RFP has proposed that 28 PACs, 2 PICs, and 12 UBC sites be added to existing OUs (bringing them under the requirements of the IAG). RFP has also recommended that the 20 polychlorinated biphenyl (PCB) spill sites be addressed under the Toxic Substances Control Act (TSCA) by the Waste Management Program, and the remaining 19 UBCs be addressed during Transition/D&D.

In order to come as close as possible to achieving the IAG commitments, RFP has already taken the following actions:

- Assigned priority of funding to higher risk OUs (1 through 7)
- Delayed high-cost efforts on OUs in the IA but has initiated non-intrusive fieldwork and an assessment of the effectiveness of the current monitoring program
- Implemented numerous efforts to improve the productivity of the ER Program
- Initiated dialogue with EPA and CDH with respect to renegotiation of the IAG
- Streamlined the ER organization for greater efficiency
- Began to assess plant infrastructure/procedures and their application to ER

The overall result is an ER Program that meets the Five-Year Plan budget but extends IAG schedules. Additionally, there are issues that remain unresolved including:

- Outyear funding requirements which exceed projected funding availability
- The need to accelerate cleanup
- The future land use of RFP
- The availability of waste repositories (for LLM, transuranic (TRU) mixed, TRU, and low-level [LL] radioactive waste) and the options for interim onsite retrievable storage

2.3 Other Planning and Productivity Improvement Initiatives To-Date

The revised ER approach has incorporated many activities and recommendations of other related efforts, including the following:

- Multi-Agency QAT: DOE-RFO, EG&G, CDH, and EPA
- Rocky Flats ER Scope, Schedule, and Cost Working Group
- Sitewide Environmental Impact Statement (SWEIS) for ER
- Integrated Planning Process (IPP)
- Other ongoing efforts to improve the efficiency and productivity of the current ER Program

These efforts have been ongoing, have kept pace with an ever-evolving program, and have been developed to streamline the process. Many of these are summarized in the following sections.

2.3.1 Quality Action Team

The QAT was established in the fall of 1992 with the charter of identifying issues that adversely affect the ability to perform ER activities at RFP and developing process improvement recommendations for senior management review. The QAT includes representatives of DOE-RFO, EPA, CDH, and EG&G. Weekly meetings have produced recommendations on the following issues:

- Streamlining Procurement Processes
- ER Budget Congressional Submittal Process
- Solar Ponds Strategy, Cost, and Schedule
- IAG Issues (details in Appendix A)

The establishment of the QAT has been beneficial because it provides a venue to maintain an open dialogue between all of the involved parties of the IAG.

2.3.2 Rocky Flats ER Scope, Schedule, and Cost Working Group

The Rocky Flats ER Scope, Schedule, and Cost Working Group was established in April 1992 by the office of Southwestern Area Programs (EM-45) and DOE-RFO. The charter of this working group was to: (1) examine RFP's ER Program, (2) address pertinent issues, (3) assist DOE-RFO and EG&G in developing a strategy (including work scope, cost, and schedule) for negotiating amendments to the IAG, and (4) examine methods for streamlining the assessment and cleanup process. This effort resulted in the development of the "current conditions" cost and schedule resources which were used to perform the expanded work scope under the current requirements of the program (within the FY94 to FY99 planning window). The "current conditions" scenario and schedule encompass issues that influence the way the ER Program is carried out including: increasing scope requirements, incorporation of EM initiatives, resource availability, and internal policy and procedural changes, while maintaining focus on the overall cleanup objectives and approach directed by the IAG.

2.3.3 Integrated Planning Process

DOE-HQ has designated RFP as a pilot site for the development and implementation of a new IPP. This IPP pilot project uses comprehensive systems engineering methodology to integrate numerous plant programs (transition, ER, economic development, plutonium and non-plutonium building baselines, residue compliance, environmental monitoring, waste management, etc.) in a manner that optimizes the balance between requirements, available resources, time, and various options for RFP's ultimate end use. As part of this IPP approach, the public is invited to participate in the process from the onset, in the hope of enhancing the effect of public input and increasing public acceptance of future RFP planning efforts.

DOE-HQ expects this IPP methodology to form the basis for national guidance to be promulgated in FY94. An additional expectation is that the FY95 program guidance

document for each program will reflect an allocation of priority and resources consistent with the results of the IPP.

The RFP IPP team has been working under the Associate General Manager (AGM) for Transition Management for several months to develop the IPP approach and associated analytical tools. Involvement of people from each of the plant's major programs was minimized until a framework was established to begin the necessary integration of programs. Since late June 1993, the IPP activities and the team activities have been fully coordinated by cross-membership and attendance of participants in activity meetings. The future efforts of the IPP will integrate other plantwide issues with the revised ER approach (e.g., waste storage, integrated risk assessment, and critical resource allocation).

2.3.4 Sitewide Environmental Impact Statement

DOE has selected a SWEIS contractor who started work in FY93 on a very limited budget. Full funding for this project is expected in FY94, FY95, and FY96, with the ROD being issued in FY96. Although the scope has yet to be determined, it appears that land and facility use issues will be of foremost importance. The SWEIS personnel at EG&G are the same people involved in developing the land use site model for the IPP, which results in continued integration between the two projects.

The site use (land and facility) questions revolve around five key concerns:

- Will the site store Special Nuclear Materials (SNM) over the next 10 to 20 years or longer?
- How much SNM processing for stabilization will be performed?
- Will the site store waste over the next 10 years or longer?
- How much waste processing will be done, and will it involve SNM removal?
- Will the site undergo long-term economic conversion?

Ultimately, the immediately pressing issues regarding Transition/D&D and ER priorities will be resolved as these questions are answered. Stakeholders have the opportunity to be involved through the NEPA process, RCRA/CERCLA public involvement, planning initiatives such as the Five-Year Plan and the IPP, and other public involvement efforts.

The site is committed to a SWEIS, the contractor has been selected, and the Colorado stakeholders are comfortable and familiar with the NEPA process. Therefore, it would be appropriate to use the SWEIS as a forum for answering these questions.

In late FY93, the focus in public meetings has shifted from an acute awareness of ER concerns to the realization that RFP has large amounts of plutonium onsite, and that the existence of this plutonium is the real hazard. This issue is expected to be one of the principal focuses of the SWEIS.

2.3.5 Operable Unit Scope and Schedules

In addition to applying internal scrutiny to the scope and schedules for each OU, the ER Program has extensively utilized external peer review to identify opportunities to reduce each project's scope and schedules. This process has resulted in substantial savings by eliminating unnecessary portions of the investigations. In addition to the cost savings that this scope reduction represents, it also has shortened some of the project schedules.

2.3.6 Rebaselining of FY93 Work Packages

In the fall of 1992, it was determined that the ER Program could be more effectively controlled if the work packages were revised and rebaselined. Results of this exercise include improved resource loadings, elimination of duplicate efforts, clarification of planning assumptions, improved performance measurement and tracking, and availability of funding for management reserve.

2.3.7 Offsite Analytical Laboratories

The addition of more offsite laboratory capacity has improved the turnaround time for environmental sample analysis, therefore making the results available sooner for interpretation and reporting.

2.4 Revised ER Approach Initiatives

Implementation of the revised ER approach at RFP would pursue the following objectives:

- Identify and implement immediate and near-term remedial actions that demonstrate to the public that DOE, CDH, and EPA are committed to an accelerated, more cost-effective, and logical site cleanup
- Develop a revised ER approach that meets regulatory requirements and is biased towards cleanup, if required, rather than study
- Identify opportunities for job stabilization/work force retraining that will make best and full use of the wealth of security-cleared and health-and-safety-trained operations, maintenance, construction, and environmental personnel at RFP
- Define current constraints to accelerating remediation and recommend regulatory, procedural, or institutional changes to resolve these restrictions (principal among this is the issue of remediation waste storage/disposal)
- Integrate, as appropriate, the plans, activities, and objectives of the QAT, the IPP Pilot Project, and other ongoing efforts to improve the execution and productivity of the RFP ER Program
- Provide an implementation strategy for this revised ER approach which includes broad stakeholder involvement and an agreement on consistency with realistic land use possibilities
- Attempt to implement strategy within current funding profile

In order to identify further process improvements that will meet the objectives listed above and accelerate ER cleanup at RFP, a Strategic Planning, Initiative, Review, and

Implementation Team (SPIRIT) was created. The team includes representatives from DOE-HQ, DOE-RFO, EG&G, and industry experts in fields such as site remediation, environmental regulations, systems analysis, planning, and consensus building. The team interacted extensively with the EG&G and DOE OU managers as well as RFP specialists in the areas of risk assessment, feasibility studies, waste management, and DOE orders and procedures. Additional team members from both EG&G and consulting firms contributed extensively to data collection, aggregation, interpretation, and display. Briefings were provided to representatives of EPA, CDH, EG&G, and DOE senior management.

3.0 MAJOR CONSTRAINING ISSUES OF THE CURRENT PROGRAM

As the analysis progressed, six major constraining issues of the current program were identified and incorporated into the development of the revised ER approach. These issues are discussed in the following sections.

3.1 The IAG

As discussed in Section 2.2, the re-evaluation of the current program was based on the requirements of the IAG. At its inception, the IAG was designed to provide as much guidance and detail to the ER Program as was possible at the time, given the current knowledge base. However, many assumptions regarding work activity, scope, duration, and cost that were used to negotiate the IAG schedules have proven to be inadequate, resulting in increasing difficulties in complying with the agreement. For example, procurement lead times, field sample analysis turnaround times, security restrictions, and document review times have all proved to be substantially longer than originally estimated. In essence, the IAG established fixed schedules covering a period of 12 years for a work scope that was ill-defined and still evolving.

The commitments and schedules in the IAG were also developed with the assumption that RFP would continue as a production facility. The result of the transition from weapons production to other beneficial uses had an impact on the timing and priorities of planned remedial actions. Further, the current lack of disposal options for LLM, TRU, or TRU- mixed wastes from RFP may also impact the ability to comply with the IAG. In addition, the technical approaches and strategies encouraged by the regulatory agencies for site investigation and remediation have evolved to promote more efficient and timely remediation (i.e., the SACM approach). These must be considered, especially in lieu of a diminishing federal budget.

The IAG incorporates the portions of RCRA/CERCLA that allow cleanup action in order to expedite risk reduction. This process, the IM/IRA, can be used to reduce immediate threats to human health and the public early in the remediation process, as well as to expedite the more traditional RI/FS process, where appropriate. It utilizes existing data and reports, where possible, to support an interim action. Although IM/IRAs are intended to be expedited actions, the four IM/IRAs implemented thus far under the IAG reflect excessive technical detail and document review requirements. Including time for internal reviews, the process from production of a Draft Decision Document to completion of an approved Final Decision Document may take more than one year. In contrast, IM/IRAs at other Superfund sites, including several in Colorado, have required as little as three to four months to complete a Final Decision Document. Finally, typical IM/IRAs at RFP require more time to implement than at other sites primarily as a result of a more rigorous and cumbersome design process. This process could be streamlined considerably by implementing a "team" approach throughout the process. Such an approach is outlined in detail in Appendix B.

DOE believes that the current IAG is outdated. However, it is not uniformly accepted that a wholesale renegotiation of the IAG is the most appropriate way to affect the revised ER approach. A revised ER approach could be implemented within the

framework of the current IAG and may only require amendments, Memoranda of Understanding, modifications or other additions to the IAG rather than a comprehensive renegotiation. This approach would reduce the lead time required for implementation of the revised ER approach.

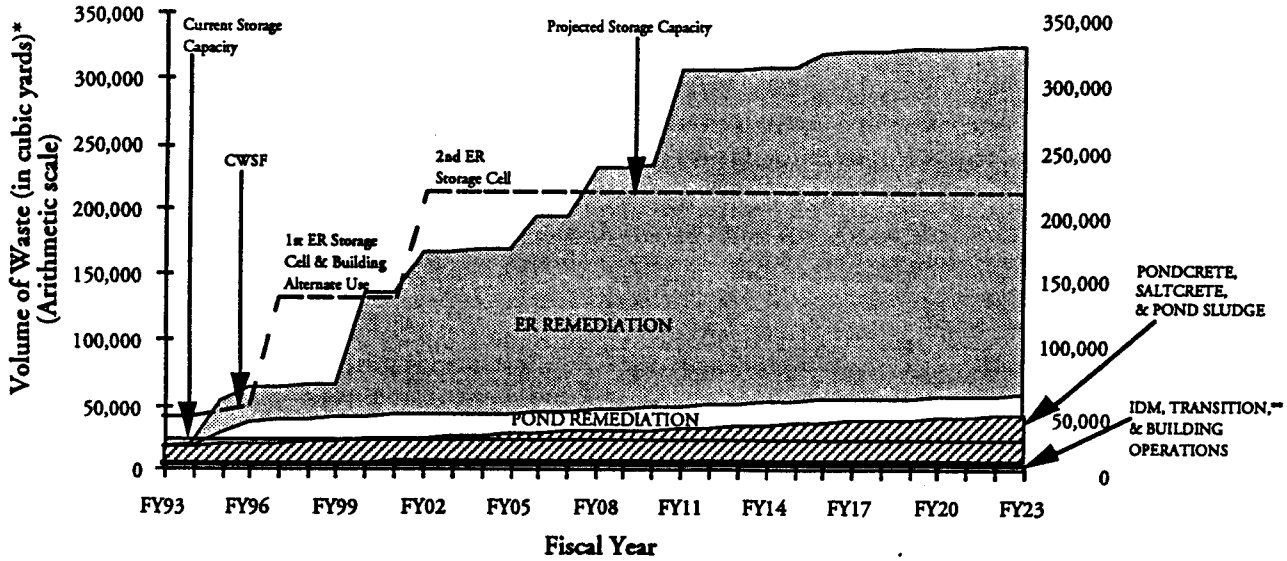
3.2 Storage and Disposal of Wastes

Storage of waste at RFP has become acute because there is currently no disposal site available for either LL TRU waste or MW. Only straight hazardous waste can currently be shipped offsite for disposal. It is expected that the Nevada Test Site (NTS) will begin accepting LL radioactive waste from RFP by the end of FY94, providing partial relief to this problem. NTS will not be able to accept LLM waste, which is the preponderant RF waste type, until FY98 at the earliest. Therefore, the revised ER approach is strongly impacted by the fact that the majority of waste generated at RFP between now and the turn of the century must be stored on the site. This will not change unless efforts to dispose selected LLM waste at a permitted treatment, storage, and disposal facility are successful, or other LLM waste treatment, storage, and disposal options become available.

Figure 3.1 and Table 3.1 depict the LLM waste-generation estimates and storage capacity projections from FY93 through FY2023 for the following waste sources: (1) maintenance of the building safety envelope, (2) transition of buildings to prepare them for D&D or alternative use (includes Phase I LLM residues with concentrations of less than 1.5 g/l), (3) investigatory-derived materials (IDM), (4) saltcrete from Building 374 liquid waste treatment system, (5) Solar Pond remediation (including pondcrete, saltcrete, liners and soil, as well as pond sludge) which will begin in FY94, and (6) ER remediation (from PEAs) under the revised ER approach, which is proposed to be initiated in FY94. No D&D waste generation estimates have been included in these projections.

The current permitted storage capacity for LLM waste is 28,488 cu. yds. The planned and proposed increases in storage include (1) the planned CWSF in FY95 with an estimated 5,000 cu. yd. capacity, (2) the proposed addition of a storage cell by FY97 with a capacity of 100,000 cu. yds., (3) the potential alternative use of building(s) beginning in FY97 with additional capacity of 5,476 cu. yds., and (4) a proposed additional ER-generated contaminated media or waste storage cell operational by FY2002 with a capacity of an additional 100,000 cu. yds. Efficient and cost-effective bulk storage of ER-generated contaminated media will necessitate some commingling of similar materials from different IHSSs. This could be done under the CAMU concept or by judicious redesignation of OUs.

In FY93, CDH delegated guidance and enforcement of IDM management to their enforcement group. This resulted in a more rigorous application of RCRA, and subsequently the amount of IDM to be managed under RCRA has greatly increased. In order to accommodate the increasing volumes of IDM, RFP proposed to construct a new 5,000-drum storage facility. A categorical exclusion was applied for under NEPA but was not granted. Subsequently, the construction of the IDM drum storage facility has been delayed until the completion of an Environmental Assessment in mid-FY95.



* Does not include any residue, D&D, or TRU waste
**Includes Phase I LLM residues (<1.5 g/l)

Figure 3.1
Low-Level Mixed Waste Generation and Capacity Projections
Projected Cumulative Generation and Storage Capacity

The waste-generation estimates and capacity projections provided in Figure 3.1 and Table 3.1 are based upon the following assumptions:

- No offsite shipment of LLM waste before FY98
- The current monthly generation rate of solid LLM waste from maintaining buildings' safety envelopes is estimated at 7.5 cu. yds. This is based on 18 months (January 1, 1992 to June 30, 1993) of data from the Waste and Environmental Management System
- The projected monthly generation rate of saltcrete from operation of the plant's liquid waste treatment system is 62 cu. yds.
- Activities from the transition of buildings for D&D or alternative use will generate an estimated 576 cu. yds. of LLM waste from FY93 to FY97 at an average of 16 cu. yds. per month based on data from the Building Alternative Use Evaluation
- Building operations, transition, and Solar Ponds remediation will require containerized storage (approved LLM waste storage containers include drums and plywood boxes)
- Solar Pond remediation will occupy 17,000 cu. yds. of container storage area, of which 10,000 cu. yds. is solid waste, and 7,000 cu. yds. is liquid stored in tanks within tents (this estimate assumes that transition waste from Building 788 will be negligible)
- The CWSF will be available in mid-FY95
- Phase II LLM residues and D&D wastes have not been incorporated into estimates
- Storage of LLM waste will be allowed in any of the current and future regulated units

Table 3.1
Waste Generation and Storage Projections by Fiscal Year[5]

Fiscal Year	Generated Waste						Storage Capacity Projected	Total Waste Generated	Difference (Storage -Waste)
	Building	Transition	IDM	Pondcrete & Saltcrete	Pond Remediation	ER Waste			
	cu. yds.						cu. yds.		
1993	1,687	0	957	12,603	0	0	28,582	15,247	13,335
1994	1,777	192	1,131	13,347	0	65	28,582	16,512	12,070
1995	1,867	384	1,201	14,091	8,500	24,143	33,582	50,186	(16,604)
1996	1,957	576	1,154	14,835	17,000	25,817	39,058	61,339	(22,281)
1997	2,047	576	1,105	15,579	17,000	25,817	139,058	62,124	76,934
1998	2,137	576	1,105	16,323	17,000	25,817	139,058	62,958	76,100
1999	2,227	576	1,105	17,067	17,000	25,817	139,058	63,792	75,266
2000	2,317	576	1,105	17,811	17,000	95,717	139,058	134,526	4,532
2001	2,407	576	1,105	18,555	17,000	95,717	139,058	135,360	3,698
2002	2,497	576	1,105	19,299	17,000	125,717	239,058	166,194	72,864
2003	2,587	576	1,105	20,043	17,000	125,717	239,058	167,028	72,030
2004	2,677	576	1,105	20,787	17,000	125,717	239,058	167,862	71,196
2005	2,767	576	1,105	21,531	17,000	125,717	239,058	168,696	70,362
2006	2,857	576	1,105	22,275	17,000	148,354	239,058	192,167	46,891
2007	2,947	576	1,105	23,019	17,000	148,354	239,058	193,001	46,057
2008	3,037	576	1,105	23,763	17,000	185,945	239,058	231,426	7,632
2009	3,127	576	1,105	24,507	17,000	185,945	239,058	232,260	6,798
2010	3,217	576	1,105	25,251	17,000	185,945	239,058	233,094	5,964
2011	3,307	576	1,105	25,995	17,000	257,279	239,058	305,262	(66,204)
2012	3,397	576	1,105	26,739	17,000	257,279	239,058	306,096	(67,038)
2013	3,487	576	1,105	27,483	17,000	257,279	239,058	306,930	(67,872)
2014	3,577	576	1,105	28,227	17,000	257,279	239,058	307,764	(68,706)
2015	3,667	576	1,105	28,971	17,000	257,279	239,058	308,598	(69,540)
2016	3,757	576	1,105	29,715	17,000	266,521	239,058	318,674	(79,616)
2017	3,847	576	1,105	30,459	17,000	266,521	239,058	319,508	(80,450)
2018	3,937	576	1,105	31,203	17,000	266,521	239,058	320,342	(81,284)
2019	4,027	576	1,105	31,947	17,000	266,521	239,058	321,176	(82,118)
2020	4,117	576	1,105	32,691	17,000	266,521	239,058	322,010	(82,952)
2021	4,207	576	1,105	33,435	17,000	266,521	239,058	322,844	(83,786)
2022	4,297	576	1,105	34,179	17,000	266,521	239,058	323,678	(84,620)
2023	4,387	576	1,105	34,923	17,000	267,012	239,058	325,003	(85,945)

- No volume reduction of the waste (a potential increase of 1,875 cu. yds. of capacity could be obtained by a two-to-one reduction)
- No resumption of weapons production
- IDM estimates do not include waste from background sites of field investigations

[5] Estimates provided by waste-generated programs. ER waste quantities provided by the revised ER approach and do not include a soil expansion factor.

- After receipt of analytical data verifying nonhazardous constituents, 20 percent of the IDM drums can be taken out of storage and either disposed in the landfill or emptied on the site
- After FY97, the annual amount of IDM going into storage equals that which is taken out of storage annually and either disposed in the landfill or emptied on the site

As shown in Figure 3.1, the projected storage demand exceeds the storage capacity by 19,675 cu. yds. between early FY95 and FY96. Several options are available for increasing waste storage capacity and efficiency including utilizing bulk storage (e.g., oversized boxes, cargo containers, waste piles, cells), permitting additional buildings for storage, and modifying permits to allow multiple waste streams to be stored in the same facility. In addition, the recent permit modification of Envirocare in Utah may allow acceptance of RFP's LLM waste for disposal and reduce the need for large-volume interim waste storage at RFP.

It is also possible that economic development projects could either improve or aggravate the waste storage situation. For example, the proposed melting down and recasting of outdated equipment at RFP into waste boxes could be a beneficial recycling/waste minimization project that would reduce the total volume of wastes requiring disposal. In addition, it would free space within buildings that could then be used for waste storage, thereby increasing the available capacity.

In addition to the concern regarding the current lack of available storage space, there is also a trade-off related to the cost of maintaining remediation wastes in indefinite storage pending final disposition. Accelerating the excavation and storage of contaminated soil or similar hazardous, radioactive, and mixed wastes in a solid form may reduce risk or enable portions of RFP to be developed for other uses. However, the benefits of taking such early actions may be offset by the waste storage costs. A more detailed discussion of these issues is provided in Appendix C.

Despite the imprecision inherent in these projections, a pressing need for two actions is apparent: (1) an expedited effort to permit and design a large-volume storage cell for ER waste, and (2) a thorough systems analysis of the entire waste storage situation at RFP (an outline of the features of such a study, along with a schedule, was generated in early October 1993).

3.3 Future Land Use

Uncertainty regarding the end use of the site has created a complex issue involving ultimate cleanup standards. Risk-based remedial action decisions are heavily influenced by potential end uses for the site. A particular end use will carry with it a corresponding level of acceptable risk, and a predetermined set of receptors and exposure scenarios. By resolving potential end use issues, the number of receptors and exposure scenarios considered in the risk assessment can be limited to only those that are pertinent. The current requirement to perform risk assessments based on an ultimate residential site end use increases the number of exposure scenarios to be evaluated and significantly increases the risk assessment schedule and budget requirements. Furthermore, a residential end use may not be consistent with the realities that are present at RFP. For example,

presumptive remedies such as landfill capping in OU7, sensitivities of flood plains and wetlands in OUs 2, 5, and 6, and constraints created by structurally unstable hillsides in OUs 1, 2, 4, 5, and 6, would preclude these areas from being considered for residential development regardless of contaminant levels. There may be some benefit, however, to assessing the potential for residential end use for several OUs. By performing risk assessments on several representative OUs consistent with a residential scenario, it could be demonstrated that the required cleanup levels are unrealistic or unobtainable. The results could then be extrapolated to other OUs to support a non-residential land use scenario.

The likelihood exists that the core of RFP could remain under federal government control with restricted access for 20 years or more. This institutional control could be temporary pending the designation of long-term storage sites for SNM, and the availability of LLM waste disposal sites. The revised ER approach, with its emphasis on early interim remedial actions, would be very compatible with this eventuality.

While the land use issue is complex and somewhat contentious, there is substantial benefit to its prompt resolution. A definitive land enduse determination could induce immediate action as opposed to additional study and its associated budget expenditures.

3.4 National Environmental Policy Act

Every planned major Federal action must first fulfill the requirements of NEPA in order to assure that the public understand and have an opportunity to comment on the proposed project. For the CERCLA program, however, NEPA requirements were waived by Congress since the public review process was effectively incorporated into the development of remedial action plans and Record of Decisions for each site. Further, it has been determined by the 11th Circuit Court of Appeals that the RCRA permitting process is the functional equivalent of NEPA. Nevertheless, it is DOE's policy to apply NEPA to RCRA and CERCLA actions in order to ensure that the site remediation process looks at broader impacts and involves more stakeholders at earlier points in the decision-making process.

NEPA regulations require consideration of "all reasonable alternatives," including the NFA alternative, and other alternatives outside the jurisdiction of the lead agency. These should be "rigorously explored and objectively evaluated" (40 CFR 1502.14), even if these alternatives are inconsistent with legal mandates (CEQ 1981). The public and other federal agencies should have significant input to the identification of alternatives during the scoping process. Because the CERCLA FS process does not require public participation to identify alternatives prior to analysis, the public's primary contribution is to review the scope of alternatives addressed in a published FS report. Addition of NEPA broadens this review process. Integration of NEPA with CERCLA or RCRA is responsive to one of DOE's five immediate priorities, which is to develop a strong partnership between DOE and its stakeholders.

NEPA/CERCLA/RCRA integration can increase time and resource requirements because it prescribes reviews and approvals by multiple DOE-HQ offices and staff. To

offset this, RFP developed a NEPA/CERCLA integration strategy that was submitted to DOE-HQ in June 1992. This revised ER approach has yet to be formally approved by DOE-HQ; however, it is already being implemented by RFP. It has been applied to the two OU2 IM/IRAs and is being applied to the OU4 IM/IRA .

Despite this strategy, the NEPA/CERCLA/RCRA integration process could be further streamlined by (1) DOE-HQ approval of the revised ER approach and (2) delegation of approval authority for Findings of No Significant Impact and Environmental Assessments to DOE-RFO. Approval authority at this level would be appropriate for most of the NFAs and PEAs identified in the revised ER approach.

3.5 Processes, Procedures, and Protocols

Some of the barriers to achieving compliance with IAG milestones and cost-effective cleanups at RFP are the results of a large number of internal RFP procedures, processes, and protocols.

The conduct of operations at RFP has traditionally been based upon those procedures and practices essential to the safe and secure handling of radioactive materials. While these procedures and practices may be essential for the protection of the work force and public during weapons production activities, they are much more stringent than those commonly employed for ER activities at major U.S. Department of Defense (DOD) facilities, private manufacturing facilities, or other hazardous waste sites. Examples of complicating requirements include the preparation of SARs for OU remediation (SARs are much more complex and expensive than the health and safety plans required by the National Contingency Plan [NCP] and Occupational Safety and Health Act [OSHA]); DOE Order 6430.1A, *Conduct of Engineering*, which requires a more rigorous engineering analysis than performed for other Superfund sites; and Operational Readiness Reviews which require more time and resources than comparable startup tests for remediation projects at non-DOE sites.

While it is possible to receive variances or waivers from some of these requirements for selected ER projects, the waivers are rarely comprehensive, making it necessary to request the same waivers on a project-by-project basis, which consumes both time and resources.

3.6 Resources

Four types of resources will have a major impact on the revised ER approach: funding, personnel, facilities, and materials (e.g., storage and disposal issues). Funding and personnel issues are discussed below.

The current Five-Year Plan identifies FY94 funding levels of approximately $156 million for the ER Program and a total of $1 billion through FY99. To facilitate its implementation, the revised ER approach was designed to be executed within the constraints of the FY94 and Five-Year Planning window budget.

It is questionable whether the current EG&G work force at RFP has the right mix of skills and experience to meet the requirements of the revised ER approach. Early

definition of the job categories and numbers needed to support a redirection is necessary to begin retraining RFP personnel, or hiring new personnel and/or subcontractors to meet these new requirements.

4.0 REDIRECTION OF THE ENVIRONMENTAL RESTORATION PROGRAM

The revised ER approach was initiated on June 21, 1993, as a continuation of the work performed by the Rocky Flats ER Scope, Schedule, and Cost Working Group. The first major activity was a week-long meeting that began with an overview of RFP and a briefing on the status of the IPP as well as the activities and responsibilities of every major RFP program (e.g., ER, residue elimination, waste management, and transition). This was followed by a more detailed ER Program briefing on an individual OU and IHSS basis with respect to the history of each IHSS, present state and planned activities, and briefings on plans for sitewide treatment facilities and other impacted/impacting activities. Based on these findings, an analysis was conducted, which used IHSSs as the lowest common denominator, to assess the potential for accelerating cleanup of RFP.

4.1 The Approach

The analysis' top priority was to identify those IHSSs where accelerated action could be taken immediately through either an IM/IRA or other appropriate procedures to accomplish the following objectives:

- Reduce risk
- Eliminate sources of contamination
- Stop the spread of potential contamination
- Accelerate RODs
- Expedite any further required remediation

To accomplish this, an analysis was conducted to evaluate the most logical revised ER approach. This analysis recognized and incorporated the following:

- The most current data with respect to the IHSSs/OUs
- The recent regulatory initiatives (i.e., SAFER, SACM, and CAMU)
- Previous experience and decisions at other Superfund and RCRA sites
- Other comparable or supporting efforts occurring nationally, locally, and sitewide

4.2 Reclassification of IHSSs into New Remedial Action Categories

After reviewing the current ER Program and evaluating the IHSSs in each OU, sufficient data were available on many IHSSs to recommend either an NFA ROD or a potential IM/IRA. However, many IHSSs (and OUs) will still require the completion of a more traditional RI/FS because of OUs' complexities and remedial action alternatives. A major portion of the IA is currently used for operations associated with the protection and storage of nuclear weapons materials and residues. These areas will likely be required for this purpose for several decades. Therefore, cleanup of many of the IHSSs in the IA should logically be deferred until the buildings or facilities are transitioned from their current mission to D&D. However, IHSSs that either pose a significant risk, or in which cleanup can proceed economically and without interference to the SNM storage and protection mission should be pursued for early remedial actions.

Using this premise, each of the IHSSs was classified into one of the four remedial action categories: No Further Action (NFA), Potential Early Action (PEA), traditional RI/FS, and Transition/D&D. For each category, standard cost and schedule assumptions were developed for the completion of a decision document or ROD. These assumptions were used as the basis for estimates regarding potential cost and time savings. An implementation plan is presently being proposed for the Integrated OUs of the IA in which several IHSSs are being linked to D&D, but many IHSSs are being recommended for accelerated action based on their accessibility, contaminant history, and potential remedial action category. The categorization of the IHSSs in each OU is summarized in Table 4.1 and Figure 1.3. A more detailed description of each category is provided in the following sections.

4.2.1 No Further Action

There are two scenarios that could result in an IHSS to be considered a candidate for NFA:

- Current field data demonstrate that the concentrations of the contaminants in the IHSS (soil or water) are not above cleanup levels
- The historical data indicates releases of only small quantities or low concentrations of hazardous and/or radioactive substances within the IHSS, such that LFI techniques (High-Purity Germanium [HPGe] radiation survey, surface wipe samples, surface soil samples, soil gas surveys, and other non-intrusive sampling activities) would suffice to demonstrate that no significant contamination exists, or that the risk to the general public associated with the IHSS is acceptable.

In the IAG, IHSSs were assigned to OU16 on the basis of potential for an NFA decision. A review of subsequently collected data indicates that there are numerous additional IHSSs that are NFA candidates. Examples of additional NFA candidates include: IHSS 133.6 (concrete wash pad) in OU5, because the Remedial Facility Investigation (RFI)/RI data indicate that no hazardous wastes are present; IHSSs 166.1, 166.2, and 166.3 (suspected disposal trenches) in OU6 as the RFI/RI found neither evidence of waste disposal nor the presence of any hazardous substances; and OU11 because analysis of the current data indicates that the risk to the general public is expected to be acceptable in the context of the potential future uses. A complete list of the IHSSs and OUs recommended for NFA is presented in Table 4.2.

For the IHSSs and/or OUs identified as NFA candidates, a Decision Document will be prepared in accordance with RCRA/CERCLA regulations and submitted to the agencies for approval and promulgation as a ROD. This approval process will include public review and comment.

4.2.2 Potential Early Action

A PEA is primarily designed to reduce the risk to the site workers and the possibility of contaminant migration or dispersion. A PEA, however, is not necessarily considered to be the final remedy except in the case of presumptive remedies as discussed below. IHSSs that meet the following criteria are recommended for PEA:

- The type, extent, and concentration of contaminants are sufficiently well-defined to enable the application of a presumptive remedy (e.g., OU7, the Present Landfill, for which RFP has recommended to the regulators for acceptance as the most likely alternative: capping, groundwater diversion, and leachate collection)
- Current field data indicate that removal of only a few hot spots (see Table 4.3 below for the proposed definition) within the IHSS would result in the IHSS being "clean" (contaminant levels at or not significantly above action levels) or acceptable based on reasonable land use possibilities. For example, at OU11, existing data indicate that plutonium is the only elevated contaminant, and thus, a radiation survey to find and accelerate removal of any hot spots and a consequent confirming risk analysis may suffice to close out that OU
- Structures such as tanks, vaults, or pads that are no longer used/needed for operations (including Transition/D&D) at RFP and can be removed or decontaminated. An example of a candidate for PEA is IHSS 118.2 in OU8, a 5,000-gallon aboveground carbon tetrachloride tank. If the carbon tetrachloride is no longer needed, the 5,000-gallon aboveground tank could be inspected, the contents recycled, and the tank either cleaned or removed
- Excavation and removal of contaminated soil involving an area less than or equal to 500 square yards (sq. yds.) that would either enable a new, more beneficial use to be made of land or buildings at RFP or avoid further dispersion of soils containing high-risk concentrations of contaminants

The 77 IHSSs that meet the PEA criteria are listed in Table 4.4.

Table 4.1
Disposition of IHSSs
by Remedial Action Category

	Total	PEA	Traditional RI/FS	NFA	T/D&D
OU1	11	4	*5	2	0
OU2	20	11	*7	2	0
OU3	4	0	1	3	0
OU4	1	0	1	0	0
OU5	10	4	1	3	2
OU6	22	7	12	3	0
OU7	2	1	0	1	0
OU8	24	12	0	3	9
OU9	21	15	**5	1	0
OU10	15	9	0	1	5
OU11	1	1	0	0	0
OU12	11	8	0	3	0
OU13	15	3	4	5	3
OU14	8	1	0	0	7
OU15	7	1	0	5	1
OU16	5	0	0	5	0
Total	177	77	36	37	27

* Listed as traditional RI/FS because groundwater contamination is a major concern but could have PEAs for soil contamination.

**Listed as traditional RI/FS for process waste lines, but 40 tanks included in IHSS 121 could be PEAs.

Table 4.2
No Further Action IHSSs

Operable Unit	IHSS	Description	Likely Contaminated Class
1	105.1	Out-of-Service Fuel Tank - Westernmost	Completely excavated during field operation construction
1	105.2	Out-of-Service Fuel Tank - Easternmost	Completely excavated during field operation construction
2	216.2	East Spray Fields Center Area	HAZ
2	216.3	East Spray Fields South Area	HAZ
3	199	Contamination of the land surface	RAD
3	201	Standley Reservoir	MW
3	202	Mower Reservoir	MW
5	133.5	Incinerator	RAD
5	133.6	Concrete Wash Pad	None
5	209	Surface Disturbance Southeast of Bldg. 881	None
6	166.1	Trench A	None
6	166.2	Trench B	None
6	166.3	Trench C	None
7	203	Inactive Hazardous (HAZ) Waste Storage Area	MW
8	137	Cooling Tower Blowdown - Bldg. 774	HAZ
8	139.2	Caustic/Acid Spills - Hydrofluoric Acid Tanks	HAZ
8	150.5	Radioactive Liquid Leaks	Deleted
9	123.2	Valve Vault West of Building 707	Deleted
10	207	Inactive 444 Acid Dumpster	MW
12	187	Acid Leaks (2)	HAZ
12	189	Multiple Acid Spills	HAZ
12	136.3	Cooling Tower Ponds - S. of Bldg. 460	None
13	169	Waste Drum Peroxide Burial	HAZ
13	190	Caustic Leak	HAZ
13	191	Hydrogen Peroxide Spill	HAZ
13	128	Oil Burn Pit No. 1	HVO/MW
13	152	Fuel Oil Tank	HVO
15	178	Building 881 Drum Storage Area	MW
15	179	Building 865 Drum Storage Area	MW
15	180	Building 883 Drum Storage Area	MW
15	204	Original Uranium Chip Roaster	MW
15	211	Unit 26, Building 881 Drum Storage	MW
16	185	Solvent Spills	HVO
16	192	Antifreeze Discharge	HVO
16	193	Steam Condensation Leak	HVO
16	194	Steam Condensation Leak	RAD
16	195	Nickel Carbonyl Disposal	HAZ

Likely Contaminated Class
HAZ - Hazardous
MW - Mixed Waste
HVO - Hazardous - Volatile Only
RAD - Radioactive

Table 4.3
Proposed Definition of "Hot Spot" (Soil)

Volume:	Less than 5 cubic yards (cu. yds.) (approximately 20 drums)
Hazard*:	• Radioactive/Metals - Risk > 10^{-4} • Volatile Organic Compounds > 1 ppm** • Total Petroleum Hydrocarbons > 600 ppm
Location:	Removal will not interfere with plant operations, will not interfere with security, or create unsafe conditions
ID:	Field Instruments as approved in Work Plans

* Levels based on human health and environmental risk
** ppm - parts per million

4.2.3 Traditional RI/FS

IHSSs that are not candidates for either an NFA or PEA and are not located in the Protected Area (PA) or in close proximity to major structures in the IA will remain on the traditional RI/FS schedule (see Table 4.5). One example is IHSS 115, the Original Landfill (in OU5), located where the volume, types, and situation of wastes (on a steep hillside and partially in the flood plain) will require a detailed FS with extensive evaluation of remedy options such as removal/treatment or *in situ* stabilization. In addition, those OUs outside the IA with potential contaminated groundwater problems are retained in this category. While these IHSSs will be pursued through the RI/FS process, many of the current RI/FS schedules could be streamlined by concurrent reviews, shortened review periods, and elimination of some intermediate deliverables (e.g., Technical Memoranda).

4.2.4 Transition/Decontamination and Decommissioning

Those IHSSs within the PA where the contaminants have low mobility, that are currently in or under buildings, or are logistically inaccessible are candidates for deferral of both detailed study and cleanup until the buildings or area they are in or under are scheduled for Transition/D&D. In addition, cleanup of IHSSs such as the retention ponds on Walnut Creek and Woman Creek should be deferred until the completion of sitewide Transition/D&D in order to provide a buffer to contain any release during plant cleanups. The list of IHSSs recommended for completion in conjunction with Transition/D&D is shown in Table 4.6. The current ER Program is partially utilizing this approach as a means to stay within the funding level provided.

Table 4.4
Potential Early Action IHSSs

Operable Unit	IHSS	Description	Likely Contaminated Class
1	102	Oil Sludge Pit	None
1	106	Outfall	None
1	119.1	Multiple Solvent Spills - West Area	HVO
1	145	Sanitary Waste Line Leak	None
2	108	Trench T-1	MW
2	109	Trench T - 2	MW
2	110	Trench T - 3	MW
2	111.1	Trench T - 4	MW
2	111.2	Trench T - 5	MW
2	111.3	Trench T - 6	MW
2	111.4	Trench T - 7	MW
2	111.5	Trench T - 8	MW
2	111.6	Trench T - 9	MW
2	111.7	Trench T-10	MW
2	111.8	Trench T-11	MW
5	133.1	Ash Pit 1-1	RAD
5	133.2	Ash Pit 1-2	RAD
5	133.3	Ash Pit 1-3	RAD
5	133.4	Ash Pit 1-4	RAD
6	141	Sludge Dispersal	MW
6	143	Old Outfall	MW
6	156.2	Soil Dump Area	MW
6	165	Triangle Area	MW
6	167.2	Pond Area	MW
6	167.3	South Area	MW
6	216.1	North Area	MW
7	114	Present Landfill	MW
8	118.1	Multiple Solvent Spills - West of Building 730	HVO
8	118.2	Multiple Solvent Spills - South End of Building 776	HVO
8	123.1	Valve Vault 7	HVO
8	135	Cooling Tower Blowdown	MW
8	138	Cooling Tower Blowdown - Building 779	MW
8	139.1	Caustic/Acid Spills - Hydroxide Tank Area	HAZ
8	150.4	Radioactive Liquid Leaks - East of Building 750	MW
8	151	Fuel Oil Leak	HAZ
8	163.1	Radioactive Site - 700 Area Wash Area	MW
8	163.2	Radioactive Site - 700 Area Buried Slab	RAD
8	184	Building 991 Steam Cleaning Area	RAD
8	188	Acid Leak	HAZ

Likely Contaminated Class

HAZ - Hazardous
MW - Mixed Waste
HVO - Hazardous - Volatile Only
RAD - Radioactive

Table 4.4
Potential Early Action IHSSs
(continued)

9	122	Underground Concrete Tank, Building 441	HAZ
9	124.1	Radioactive Liquid Waste Storage Tank - 30,000-Gallon Tank (T-68, Unit 55.14)	MW
9	124.2	Radioactive Liquid Waste Storage Tank -14,000-Gallon Tank (T-66, Unit 55.15)	MW
9	124.3	Radioactive Liquid Waste Storage Tank -14,000-Gallon Tank (T-67, Unit 55.16)	MW
9	125	Holding Tank	MW
9	126.1	Out-of-Service Process Waste Tanks - Westernmost Tanks	MW
9	126.2	Out-of-Service Process Waste Tanks - Easternmost Tanks	MW
9	132	Radioactive Site - 700 Area	MW
9	146.1	Concrete Process Waste Tanks 7,500-Gallon Tank (#31)	MW
9	146.2	Concrete Process Waste Tanks 7,500-Gallon Tank (#32)	MW
9	146.3	Concrete Process Waste Tanks 7,500-Gallon Tank (#34W)	MW
9	146.4	Concrete Process Waste Tanks 7,500-Gallon Tank (#34E)	MW
9	146.5	Concrete Process Waste Tanks 3,750-Gallon Tank (#30)	MW
9	146.6	Concrete Process Waste Tanks 3,750-Gallon Tank (#33)	MW
9	215	Unit 55.13 - Tank T - 40	MW
10	170	P.U. & D. Storage Yard - Waste Spills	MW
10	174	P.U. &D. Container Storage Facilities (2)s	MW
10	175	S&W Bldg. 980 Container Storage Facility	MW
10	176	S&W Contractor Storage Yard	MW
10	181	Building 334- Cargo Container Area	MW
10	182	Building 444/453 - Drum Storage Area	MW
10	205	Building 460 Sump #3 Acid Side	HAZ
10	208	Inactive 444/447 Waste Storage Area	HAZ
10	210	Unit 16, Building 980 Cargo Container	HAZ
11	168	West Spray Field	HAZ
12	116.1	Multiple Solvent Spills West Loading Dock Area	MW
12	116.2	Multiple Solvent Spills South Loading Dock Area	MW
12	120.1	Fiberglassing Areas North of Building 664	MW
12	120.2	Fiberglassing Areas West of Building 664	MW
12	136.1	Cooling Tower Ponds Northeast Corner of Building 460	MW
12	136.2	Cooling Tower Ponds West of Building 460	MW
12	147.2	Process Waste Leaks Owen Area	RAD
12	157.2	Radioactive Site South Area	MW
13	117.3	Chemical Storage South Site	HVO/MW
13	158	Radioactive Site - Building 551	RAD
13	171	Solvent Burning Ground	MW
14	164.3	Radioactive Site - 800 Area #2 Building 889 Storage Pad	RAD
15	217	Unit 32, Building 881, CN- Bench Scale Treatment	MW

Likely Contaminated Class

HAZ - Hazardous
MW - Mixed Waste
HVO - Hazardous - Volatile Only
RAD - Radioactive

Table 4.5
Traditional RI/FS IHSSs

Operable Unit	IHSS	Description	Likely Contaminated Class
1	103	Chemical Burial	HVO
1	104	Liquid Dumping	HVO
1	107	Hillside Oil Leak	HVO
1	119.2	Multiple Solvent Spills - East Area	MW
1	130	Radioactive Site - 800 Area Site #1	MW
2	112	903 Pad Drum Storage	MW
2	113	Mound Area	MW
2	140	Reactive Metal Destruction Site	MW
2	153	Oil Burn Pit No. 2	MW
2	154	Pallet Burn Site	MW
2	155	903 Lip Area	MW
2	183	Gas Detoxification Area	HAZ
3	200	Great Western Reservoir	MW
4	101	207 Solar Evaporation Ponds	MW
5	115	Original Landfill	MW
6	142.1	A-1 Pond	MW
6	142.2	A-2 Pond	MW
6	142.3	A-3 Pond	MW
6	142.4	A-4 Pond	MW
6	142.5	B-1 Pond	MW
6	142.6	B-2 Pond	MW
6	142.7	B-3 Pond	MW
6	142.8	B-4 Pond	MW
6	142.9	B-5 Pond	MW
6	142.12	Newly Identified A-5 Pond	MW
6	196	Water Treatment Plant	HAZ
6	167.1	North Area	MW
9	121	Original Process Waste Lines	MW
9	127	Low-Level Radioactive Waste Leak	MW
9	147.1	Process Waste Leaks- Mass Area	MW
9	149	Effluent Pipe	MW
9	159	Radioactive Site Building 559	MW
13	134	Lithium Metal Destruction Site	HVO
13	157.1	Radioactive Site North Area	MW
13	186	Valve Vault 12	MW
13	197	Scrap Metal Sites	MW

Likely Contaminated Class

HAZ - Hazardous
MW - Mixed Waste
HVO - Hazardous - Volatile Only
RAD - Radioactive

Table 4.6
Transition/D&D IHSSs

Operable Unit	IHSS	Description	Likely Contaminated Class
5	142.1	C1 Pond	RAD
5	142.11	C2 Pond	RAD
8	144	Sewer Line Break	MW
8	150.1	Radioactive Liquid Leaks - North of Building	MW
8	150.2	Radioactive Liquid Leaks - West of Building	RAD
8	150.3	Radioactive Liquid Leaks - Between Buildings 771 & 774	RAD
8	150.6	Radioactive Liquid Leaks - South of Building 779	MW
8	150.7	Radioactive Liquid Leaks - South of Building 776	RAD
8	150.8	Radioactive Liquid Leaks - Northeast of Building779	MW
8	172	Central Avenue Waste Spill	MW
8	173	Radioactive Site - 900 Area	MW
10	129	Oil Leak	MW
10	177	Building 885 Drum Storage Area	MW
10	206	Inactive D-836 Hazardous (HAZ) Waste Tank	MW
10	213	Unit 15, 904 Pad Pondcrete Storage	RAD
10	214	Unit 25, 750 Pad Pondcrete and Saltcrete Storage	RAD
13	117.1	Chemical Storage North Site	MW
13	117.2	Chemical Storage Middle Site	MW
13	148	Waste Spills	MW/HAZ
14	156.1	Radioactive Soil Burial-Building 334 Parking Lot	MW
14	160	Radioactive Site - Bldg. 444 Parking Lot	MW
14	164.1	Radioactive Site - 800 Area #2 Concrete Slab	RAD
14	131	Radioactive Site - 700 Area	MW
14	161	Radioactive Site - Bldg. 664	MW
14	162	Radioactive Site - 700 Area Site #2	MW
14	164.2	Radioactive Site - 800 Area #2 Building 886 Spills	RAD
15	212	Unit 63, Building 371 Drum Storage	MW

Likely Contaminated Class
HAZ - Hazardous
MW - Mixed Waste
HVO - Hazardous - Volatile Only
RAD - Radioactive

4.3 Methodology and Assumptions for Developing Cost and Schedule Estimates

During the development of preliminary cost and schedule estimates, several assumptions were made. The methodology and assumptions of these estimates are provided in the following sections. They are also discussed in more detail in Appendix F. Additionally, detailed backup for the estimates have been compiled and are available for review (SPIRIT Reference Volumes I, II, and III).

4.3.1 Potential Early Remedial Actions

As part of the IHSS categorization process, the experience and data from other DOE sites were reviewed to identify PEA remedial alternatives for use on the candidate RFP IHSSs. The emphasis for selection of PEA remedial alternatives was primarily on standard, thoroughly demonstrated techniques and technologies that could be cost-effectively implemented at RFP by writing standard procedures and forming and training remediation teams from within the existing RFP work force where possible.

The PEA remedial alternatives include the following options:

- Remove and store/dispose
- Hot spot removal/NFA
- Cap/soil cover
- Hot spot removal/cap or cover
- Remove tanks
- Institutional controls
- Soil vapor extraction
- Innovative treatment
- Stabilization/solidification
- Groundwater pump and treat
- Water diversion

The distribution of PEA remedy alternatives by OU and the number of IHSSs considered feasible for each PEA remedy are as shown in Figure 1.3. Issues and barriers associated with the implementation of each of the PEA remedies at RFP are also identified and presented in Table 4.7.

4.3.2 Schedules

When the remedial action categories and PEA remedies were established for each IHSS, a time line was developed for the fiscal year in which the remedial action could be initiated. The major controlling factor for PEA scheduling is the shortage of LLM waste storage space at RFP pending availability of offsite disposal. Therefore, one logical sequence for pursuing IHSSs proposed for PEAs is (1) those PEAs involving hazardous wastes only because offsite disposal sites are presently available, (2) LL radioactive waste PEAs because it is expected that RFP will be able to begin resumption of disposal at NTS by early FY94, and (3) LLM waste PEAs because a DOE disposal site is not expected to be available for at least four more years (although a commercial LLM waste disposal site might be able to accept selected RFP wastes as early as 1995). The schedule and cost estimate for the activities will be refined in more detailed implementation plans. A summary for each IHSS, including description, size, contaminants, remedial action category, and PEA remedy is presented in Appendix D.

In parallel with the categorization of the IHSSs and the identification of possible remedies, process logic and preliminary schedules were developed for the NFA and PEA remedial action categories. In all cases, completion of either an NFA or a PEA will require a sufficient amount of field data to confirm the presence/absence, nature,

concentration, and extent of any contamination. For OUs 1, 2, 3, 4, and 6, the RFI/RI field investigations are essentially complete, so the NFA or PEA process could begin after the review of the validated field data (as shown in Figure 4.1). For the other OUs, the data needed to confirm the viability of a NFA or PEA could be generated by an LFI as shown in the process logic presented in Figure 4.2. This logic forms the basis for developing schedules and costs for PEA and NFA implementation.

For both of these schedules, the durations for execution of the Remedial Action Plan and ROD are conservative estimates, because neither one of these documents has been prepared yet at RFP. The major increases in time from the original IAG occur in the procurement of support contracts and in DOE/regulator document review cycles. Schedule improvements are anticipated during the development of the first set of these documents. Any improvements so identified could then be applied to subsequent OU schedules through a formal change control process.

4.3.3 Cost Estimates

The following sections present the key assumptions and parameters used to develop the preliminary cost estimates for the revised ER approach. The above schedule parameters were utilized to develop these cost estimates by IHSS and OU and to summarize the cost by fiscal year for the revised ER approach.

4.3.3.1 Soil Treatment

One major assumption in the estimates was that the majority of soil requiring treatment would be excavated and treated by soil washing. Soil washing applies to several relatively-proven technologies (which include graviometric separation, magnetic separation, and possible bioremediation) that are applicable to the type of soil and contaminant (primarily metals, organics, and radionuclides) present at RFP. The following additional assumptions were made:

- A total of 80 percent of the excavated soil could be returned to the site after treatment
- A total of 20 percent of the excavated and treated soil (concentrated contaminated solids) would require onsite storage until offsite disposal is possible (Note: LDRs apply to the residual waste, further treatment may be required.) It is necessary to integrate planning with the Conceptual Site Treatment Plan (CSTP), which is being prepared in compliance with the LDR Federal Facilities Compliance Agreement between DOE, CDH, and EPA
- A total of 100 percent of soils that contain hazardous contaminants only will be excavated, packaged, and shipped to offsite commercial disposal facilities
- Soils that contain predominantly volatile organic compounds will be remediated by soil vapor extraction

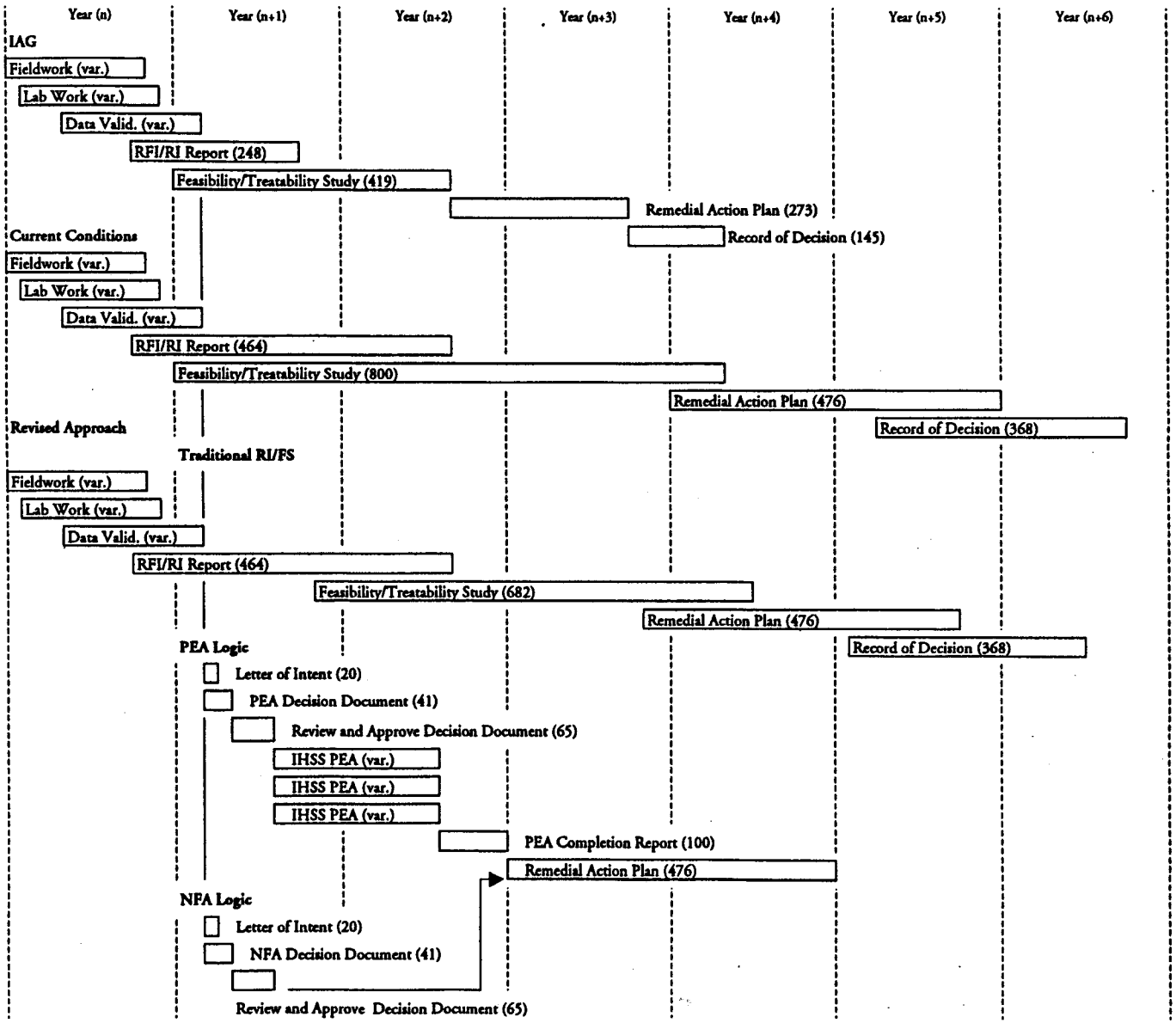
Table 4.7
Issues/Barriers for Remedial Alternatives

Approach	Planning	Characterization	Design	Implementation	Operation/Closure
Hot spot Removal/NFA	Finalize hot spot identification criteria [22]	IM/IRA or LFI focused on contaminants of concern [1] [16]	[2] [3]	Screen, identify hot spots, and place in acceptable containers [4] [5]	Store MW, rads, ship hazardous wastes to permitted facilities [6] [7] [8] [9]
Hot spot Removal/Cap or Cover	Finalize hot spot identification criteria [10] [22]	IM/IRA or LFI focused on contaminants of concern [1] [11] [16]	[2] [3] [13] Demonstrate compatibility with end-state land use [12]	Screen, identify hot spots, and place in acceptable containers [4] [5] [14]	Store MW, rads, ship hazardous wastes to permitted facilities [6] [7] [8]
Removal Store/Disposal	Develop specialized techniques as required (e.g., pyrophoric drum removal) [4] [14] [22]	Focused Feasibility Study (FFS) or IM/IRA	[2] [3] .	Remove materials [5]	Store or ship to TSD [6] [7] [8]
Groundwater Pump and Treat		Determine flows, direction, volumes, and plume size [15] [16]	Design extraction well field discharge[14] [17] [15], conduct pilot studies as necessary	Install wells, piping, and treatment facility [5]	Secure necessary permits [18]
Water Diversion	Impact on ponds or National Pollutant Discharge Elimination System (NPDES) permits	FFS	[14]	[4]	Secure necessary permits
Soil Vapor Extraction	Review transportability of OU 2 IM/IRA	Determine plume size [16]	Conduct pilot studies, design system [14]	Install system [4] [5]	Secure necessary permits [18]
Innovative Treatment	Conduct proof-of-principle test [19]	Select best site for field demonstration	Prepare demonstration work plan [20]	Conduct tests and prepare demonstration report [4]	
Institutional Control	Evaluate available options [12][21]	Initiate stakeholder discussion	Determine compatibility with end-state land use	Develop stakeholders implementation plan	[9]
Stabilization/Solidification	Determine need above/beyond storage in containers	Conduct treatability studies and select optimum reagents	[2] [3]	Excavate and treat, store, and ship [4] [5]	[6] [7] [8]
Remove Tanks	Develop work plan categorizing candidate tanks by location, content, and design	Identify data and determine contents [1]	Prepare relevant procedures by tank type, content, and location [2] [4] [14]	Remove contents [4] and pull tanks [5] [14]	Process and dispose [3] [6] [7] [8

Notes:

[1] Identify acceptable screening analysis and representative sampling regime.
[2] Determine acceptable drums/containers for long-term storage for MW.
[3] Identify and develop contracts with hazardous waste TDS for receipt of hot spots.
[4] Expedite IWCP and SAR and produce generic SOPs.
[5] Retrain field staff and create pool of crafts support for on-call service.
[6] Find/upgrade available space for RCRA/AEA-compliant storage.
[7] Extend state storage capacity ceiling if necessary.
[8] Finalize procedure for IDM and determine impact on storage space.
[9] Determine criteria likely to justify NFA.
[10] Determine compatibility of residuals with capping.
[11] Identify acceptable means of characterizing cap-incompatible materials.
[12] Involve state in end state land use intermediate test case.
[13] Gain approval for vegetative cover.
[14] Develop streamlined engineering procedures.
[15] Determine regional groundwater characteristics and relevant boundary conditions.
[16] Develop streamlined access provisions for offsite contractor work.
[17] Conduct water management study to identify available resources.
[18] Negotiate conditions to terminate pumping.
[19] Identify best TD program and obtain support.
[20] Determine requirements from OTD project manager.
[21] Conduct trade-off analysis among available institutional control options.
[22] Conduct trade-off risk assessment versus leaving in place.

Figure 4.1
Schedule Logic and Average Duration (Days) for OUs
OUs That Have Completed Fieldwork
(OUs 1, 2, 3, 6, 7)



4.3.3.2 Volume Reduction and Interim Storage

Selective removal or isolation of contaminated areas within a specific IHSS will reduce risk of migration and will minimize soil volumes to be treated. This approach would accelerate cleanup without compromising the risk to both the public and the environment. Table 4.8 presents comparisons between previous soil volume estimates and estimates which reflect the potential reductions achievable under the revised ER approach.

Table 4.8
Comparison of Soil Estimates Between the Current Approach and the Revised ER Approach

Operable Unit	Current Approach (cu. yds. of soil)	Revised ER Approach (cu. yds. of soil)	Difference (cu. yds.)
OU2	112,810	71,788	(41,122)
OU5	24,433	17,440	(14,403)
OU12	2,450	465	(1,985)

The estimates of soil volume to be treated under the revised ER approach represent an effort to more precisely define the extent of contamination at the source and then to excavate or immobilize all or most of the contamination to provide immediate corrective action to those areas. Initiating IM/IRAs for an individual IHSS (or group of similar IHSSs) would alleviate having to wait for an ROD to implement a corrective action.

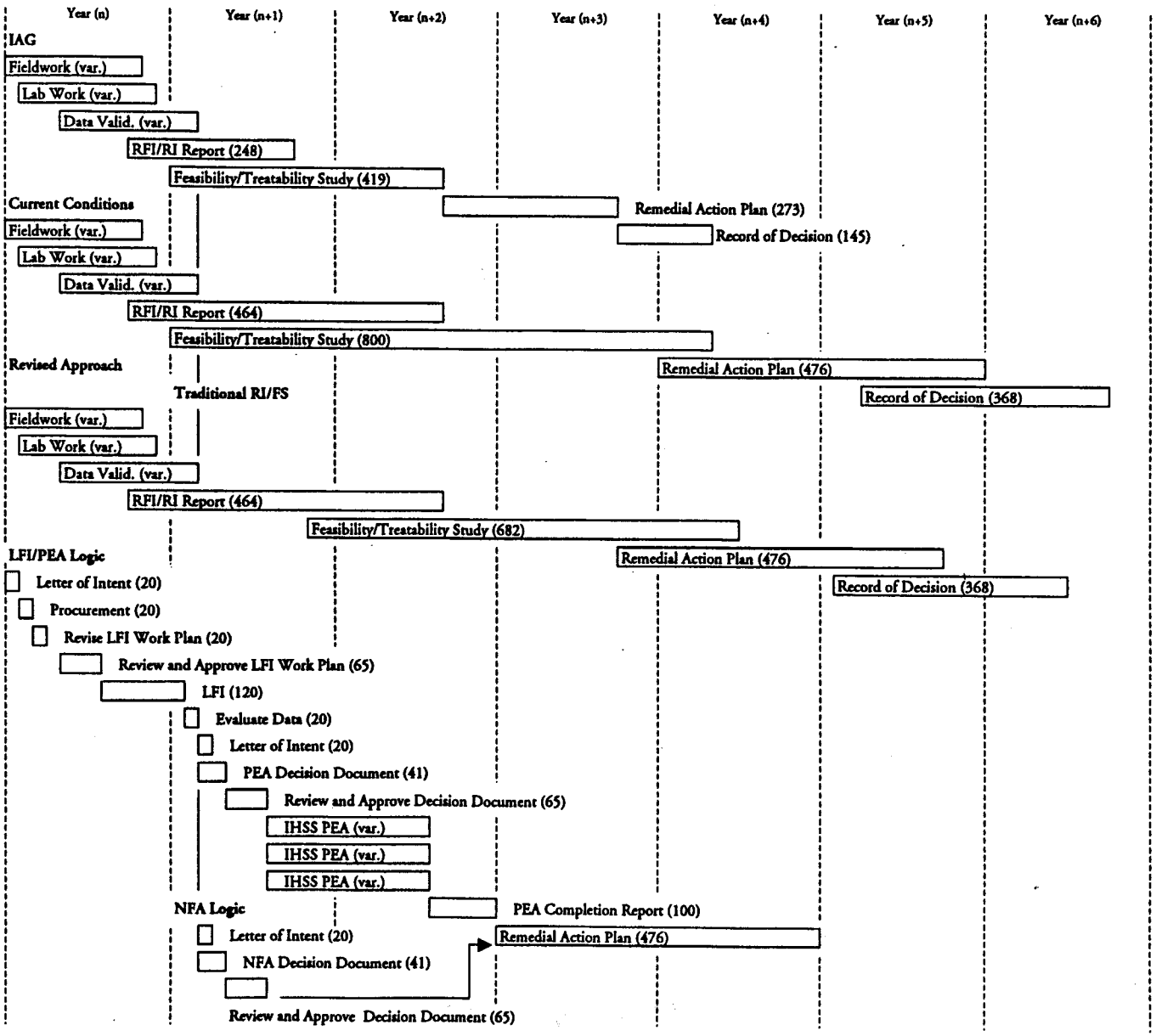
In addition, implementation of the IM/IRAs could reduce the cost and schedule requirements of traditional RI/FS activities by lessening the work scope and the complexity of the study. Of course, these savings are offset by the additional cost of developing the IM/IRA Decision Documents. An accurate comparison of these tradeoff costs is not possible until more detailed implementation planning is accomplished.

The successful implementation of this revised ER approach is dependent upon its ability to dispose of ER-generated contaminated media and waste. Interim onsite storage capabilities will be required pending the availability of offsite disposal. Construction of two 100,000 cu. yd. capacity storage cells has been factored into the revised ER approach cost, schedules, and assumptions. Some regulatory concessions, such as CAMU designations and/or regrouping of the current OU boundaries, will be required to allow for judicious aggregation of materials from different IHSSs that have similar contaminants or are judged to be similarly treated.

4.3.4 Program Lifecycle Cost

The above-mentioned schedule and cost parameters were used in conjunction with other historical cost estimating data to develop preliminary annual cost estimates and program lifecycle costs for the revised ER approach. The results are portrayed in Figure 1.4, and costs are detailed in backup documentation (SPIRIT Reference Volumes I, II, and III). These preliminary estimates are intended for better understanding of orders of

Figure 4.2
Schedule Logic and Average Durations (Days) for OUs
OUs That Have Not Completed Fieldwork
(OUs 8, 9, 10, 11, 12, 13, 14,15)



magnitude costs. More accurate estimates will not be possible until the details of the revised ER approach are agreed upon by the regulators and detailed implementation schedules and plans are developed

4.4 Changes in OU Configurations

There are several compelling reasons to regroup the current OU structure into a more efficient configuration:

- Combination of overlapping or similar OUs will save resources by conducting more efficient field investigations and reducing the number of documents required as a result of economies of scale (one RFI/RI report instead of three or four)
- Better assessment of contaminant fate and transport migration (combining OUs would allow for more effective examination of contaminant pathways, such as groundwater, which would be inhibited by the use of inappropriate artificial OU boundaries)
- IHSSs with similar problems and solutions could be grouped together resulting in more cost-effective remediation
- IHSSs in areas of RFP that are impacted by the infrastructure and restrictions associated with continuing operations should be evaluated and remediated together so as to minimize security, logistical, and/or health and safety risks

Analysis of the current OUs suggests the following changes:

- Consolidate OUs 8, 9, 10, 12, 13, and 14, each of which contain IHSSs scattered throughout the IA, into action specific groupings such as an NFA grouping, a Transition/D&D grouping, a PEA grouping, an LFI grouping, an RFI/RI grouping, and at least one Closure grouping. These OUs are already being managed as an integrated unit for some activities (e.g., non-intrusive sampling, ecological evaluations, and consolidated risk assessment). However, these OUs are still officially separate, requiring separate approvals of individual work plan changes; separate program management documentation and management; and separate generation of RI/FS documents, all of which requires excessive resources and time. DOE-RFO has proposed to the regulators that the OUs be officially combined. Notwithstanding the consolidation, the PEAs identified earlier within these OUs (see Table 4.4) could still be implemented
- Evaluate the potential for establishing one or several sitewide groundwater/surface water OUs. This configuration would ensure a more accurate understanding of groundwater flow, contaminant transport, groundwater/surface water interactions, and potential exposure pathways. Removal of the groundwater issue from the OUs will transfer the focus to source removal and isolation and could reduce the time required to complete accelerated cleanups by streamlining the IM/IRA Decision Document process for the IHSSs within the OUs
- Place all of the retention pond sediments (except those in the present landfill runoff retention pond in OU7) into one OU because any contaminated sediments probably will require very similar, if not identical, remediation technologies. This may also simplify the permit issues. The ponds should continue to be used as a spill

prevention measure until the remainder of the IA is remediated. Thus, this OU would be the last to be remediated

4.5 Current Activities that Should be Deferred or Terminated

The review of all of the current support, planning, and development efforts of the ER Program indicate that there are several major activities under way at RFP that are no longer necessary, are premature, or will inhibit the implementation of the revised ER approach. These activities, several of which are described in the following sections, should be either deferred or terminated and the associated funds should be redirected to support PEAs or to increase the LLM waste storage capacity.

4.5.1 Termination of Intercepted Water Treatment

Upon initiation of the ER Program at RFP, there was visible evidence of alluvial groundwater surfacing as springs and seeps within several of the OUs and causing surface water pollution. To control this problem, four IM/IRAs were instituted to intercept, divert, and treat the alluvial groundwater within OU1, and alluvial groundwater and surface water within OU2. Even though, the water quality in several of the diversion systems currently meets the RFP National Pollutant Discharge Elimination System (NPDES) discharge requirements without any further treatment, the water is still being collected and treated. Discussions are underway to cease recovery and treatment of water from OU1 and OU2. This would reduce operating costs, making additional funds available for other higher priority cleanup, and make additional waste water treatment capacity available for future development.

4.5.2 Sitewide Treatment Facilities

The current ER Program includes a planned effort to design and construct treatment facilities at RFP to treat contaminated soils, exhumed wastes, and contaminated groundwater. In the case of the soils and wastes, the principal assumption associated with the development of the soil and exhumed waste treatment facilities is that an LLM waste disposal site may not be available in FY97. It is also assumed that treated groundwater would either be discharged to surface water or used for decontamination water during field investigations. Coupled with the construction of the treatment facilities, planning assumptions include construction of retrievable waste storage facilities (cells) that would contain treated wastes (including sludge, waste water, contaminated equipment, and supplies) and other wastes generated during waste treatment until an offsite disposal site is available. It may not be prudent to build a waste treatment plant and treat and store wastes without knowing the final degree of treatment (waste acceptance criteria [WAC]) required for disposal, an issue that is disposal-site dependent.

A better approach may be to defer design and construction of treatment facilities until the disposal site becomes available and begin to construct interim retrievable storage cells. This will help to solve the storage capacity problem at RFP, enable IHSS cleanups to be accelerated, and possibly avoid significant costs to redesign treatment facilities or retreat wastes. For example, the current plan to remove sludge from the OU4 Solar

Ponds and store it in tents will consume valuable waste storage capacity which may be required to implement the revised ER approach for the rest of the ER Program. If long-term interim storage appears inevitable, it may not be prudent to remove most of the contaminated media from the ground.

4.6 IM/IRA for Early Actions

The IM/IRA process may be used as a means to rapidly initiate remedial actions at RFP, while reducing or eliminating a potential threat to human health and the environment. The term "IM/IRA" is a combination of the RCRA term "Interim Measure" and CERCLA term "Interim Remedial Action" as defined by the IAG. IM/IRAs are accelerated by limiting the number and scope of required documents and by limiting the number and duration of reviews. A detailed discussion on the IM/IRA process is provided in Appendix E.

The early cleanup of IHSSs utilizing PEAs can be accomplished by all parties approving of an IM/IRA process for sitewide early actions. These IM/IRA documents would include procedures for the identification, removal, verification, and documentation of candidate PEAs, a definition of the level of detail required, a description of the review and approval process, and the schedule for implementation. The IM/IRA document would also include a list of candidate IHSSs and PEAs, each with sufficient detail to provide a clear understanding to the public of what is being proposed. A formal review/approval process, including public comment, would be followed to achieve an approved IM/IRA Decision Document. A completion report on each PEA would then be submitted for public review and regulatory agency approval and then appended to the IM/IRA. Additional PEA candidates would be recommended as appendices to the overall IM/IRA and would follow a standard review and approval process.

4.7 Modifications to the IAG

Modifications to the IAG would facilitate the revised ER approach. A modified IAG should be less of an enforcement document and more of a facilitating tool that not only gives all signing parties the opportunity to achieve their common goal of environmental cleanup with commitments but also include flexibility to accommodate the uncertainties inherent in the ER Program. In essence, a modified IAG would endorse an accelerated cleanup model as the revised ER approach to cleanup at RFP. Desired features of an IAG modification are detailed in the following sections.

4.7.1 Milestone Modifications

Given the lessons learned over the past four years, it is not realistic for any party to commit to a long series of milestones beyond a realistic planning and budget window. Therefore, one approach might be that firm milestone commitments be no more than two years in advance. Milestones beyond the two-year window would be used for planning purposes and would be subject to annual review and agreement prior to becoming new milestone commitments into the next two-year window. This revised ER approach provides the opportunity for all parties to maintain a more interactive

relationship and allows the overall program to be more dynamic and responsive to changing conditions.

Additionally, if milestones are sequential, it must be acknowledged that all antecedent milestones will be extended if a predecessor milestone is extended. This also provides a mechanism for achieving tri-party accountability.

4.7.2 Risk Assessment and Land Use

Exposure scenarios and reasonable maximum exposures need clear definition in order to assess risk factors associated with site end use. While it is not realistic to expect that a final binding site end use is established by modifying the IAG, it should be recognized that a goal of unrestricted use is not plausible for all of RFP. The IAG should establish realistic endstate possibilities for various portions of the site to allow expedited cleanup actions to proceed, consistent with a range of several plausible endstates. All parties should agree upon standard risk assessment methodology which would be utilized to the greatest extent possible.

4.7.3 Change Control Process

The Change Control procedures currently applied by DOE and EG&G should be included in a modified IAG. This would prevent a project from being unilaterally impacted by constantly changing requirements. All parties would be accountable for the scope, schedule, and budget of the project, and the regulatory agencies would be allowed to participate in the development of project funding profiles.

4.7.4 Reorganization of Operable Units

Changing conditions at RFP have created the opportunity to redefine some of the OUs, especially the IA OUs, in a manner that would facilitate accelerated cleanups or allow specific IHSSs to be addressed individually as proposed in the revised ER approach. This would enable all parties to be proactive in expediting cleanup activities at RFP. An example would be to organize IHSSs according to their early action. For example, hot spot removals or PEAs in an area that has particular significance related to land use could be grouped together, and/or separated from IHSSs that require a traditional RI/FS as a result of their complex nature. This strategy would serve to focus the required actions in a more efficient manner.

4.7.5 Interim Waste Storage

The current IAG does not address waste handling and storage issues. It is well recognized by all parties that this may be the key issue in performing not only expedited cleanups but any remediation at RFP. The IAG may be utilized to establish precedents for interim storage of remediation wastes which would allow remediation to proceed more aggressively. This action could take the form of permitting aboveground storage cells, implementation of CAMUs, or other means to facilitate waste consolidation from multiple OUs.

4.7.6 Transition/Decontamination and Decommissioning

The change in plant mission has also provided the opportunity to begin planning the transition of the plant from a production facility to D&D. Because this process also requires significant stakeholder involvement, it may be beneficial for all participating parties if (1) the modified IAG provided guidance for the planning of these activities and (2) defined the requirements for transitioning a building for economic development, waste storage, demolition, and other activities. It should not establish long-term milestones for D&D. This would only be a repeat of previous deficiencies in the original agreement as a result of scope uncertainties and funding requirements.

Many of these issues with the present IAG have been discussed with the regulators in a variety of forums, and there has been acknowledgment that their resolution is imperative for the revised ER approach to proceed. While these issues do not represent a complete accounting of everything that may require attention in a modified IAG, it is the intent of this document to identify the key issues.

4.8 Site-Based Decision Making

In order to facilitate the implementation of this revised ER approach, a team approach to staffing should be used with people at the lowest management level empowered to make decisions in real time which allows concurrent review and discussion by all stakeholders. To accomplish this, expedited delegation of decision authority from DOE-HQ to DOE-RFO is necessary. In addition, locating regulatory agency staff at RFP who are empowered to make OU and action-specific decisions would expedite the process and emphasize the commitment to action. Other stakeholder representatives should be included in discussions and reviews at the earliest practical opportunity.

4.9 Stakeholder Involvement

During the formulative meetings, stakeholder involvement was limited to DOE, EG&G, support contractors, and the regulators. Future activities will involve a broader segment of the public if the revised ER approach is approved and moves into the implementation planning phase.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The IAG prescribes the extent and time frames for cleanup of RFP's 16 OUs. As a result of a steady increase in the work scope, increased requirements for program execution (offset by little or no modifications to the IAG schedules), and funding shortfalls, the ER Program has not been able to meet the IAG commitments, and has no prospects of returning to the original IAG schedule. A number of procedural and organizational efforts have been taken or are underway to improve the program efficiency and address these IAG issues, including: the QAT, the IPP, the integration of IA OUs, integrated procurement, and the development of a sample management system. In addition to these efforts, RFP management sees great potential in making a significant revision to the approach of the ER Program. This revised ER approach would accelerate cleanup and achieve substantial cost effectiveness without compromising either human health or the environment. This would be accomplished by:

- Initiating IM/IRAs for an individual IHSS (or group of similar IHSSs) to accelerate remedial action without waiting for completion of a ROD/CAD for an entire OU

- Eliminating current operations for which results indicate that contamination is not significant and poses no immediate risk to the public or the environment (i.e., groundwater treatment at OU1)

- Deferring activities on many of the IHSSs within the IA that pose no immediate risk to the public and the environment and that can be integrated with Transition/D&D for technical and cost-effective reasons

IM/IRAs could reduce the volume of contaminated waste requiring treatment, which in turn, would lessen the interim waste storage capacity requirements and minimize costs. Finally, initiating IM/IRAs should improve the cost and schedule requirements of the remaining traditional RI/FS efforts by reducing the work scope and complexity of the study.

The following are recommendations for the continued pursuit and implementation of the revised ER approach:

DOE-HQ

- Endorse the revised ER approach as the planning basis for the RFP ER Program and IAG modifications. This approach, which includes acceleration of cleanups, redefinition/consolidation of some OUs, standardization of risk assessment methodology, and linkage to some reasonable range of land uses, allows RFP to initiate a conceptual approach which could provide guidance for redirection of ER while forming the basis for modifying the IAG. In addition, the IAG should be modified to reflect new milestones and a change control mechanism that allows flexibility in its commitments as increased knowledge and experience are obtained

- Accelerate resolution of future land use and waste disposal/interim storage issues. Agreement must be reached that certain sections of RFP will not have unlimited

future land uses, and that IM/IRAs that are consistent with reasonably anticipated future land uses are prudent. In addition, the reasonably anticipated future land use determinations must account for economic factors and normal land use planning factors such as topography, wetlands, flood plains, unique habitats, and legal restrictions (i.e., mineral rights)

- Intensify ongoing efforts to streamline DOE orders for ER applicability and delegate additional local decision-making authority to DOE-RFO (i.e., for SARs). Cooperative efforts for recognition of the requirements and objectives of all involved parties, will provide a stronger partnership between DOE and its stakeholders. This process could be further streamlined by delegation of approval authority for Findings of No Significant Impact and Environmental Assessments from DOE-HQ to DOE-RFO, which would be appropriate for most of the NFAs and PEAs identified in the revised ER approach. In addition, locating regulatory staff at RFP who have decision-making authority would expedite the process and streamline document preparation and review

- Reach agreement with regulatory agencies on the revised ER approach and initiate broad stakeholder involvement. Detailed implementation planning will require agreement by the regulators on a number of technical issues

- Develop waste disposal/storage cost options for the revised ER approach. Options must be evaluated for reducing the waste storage requirements including: treatment of the waste (such as by soil washing) to reduce the volume, different waste handling and storage practices (such as bulk storage), or commingling of similar contaminated media from different OUs (either through a CAMU or judicious redesignation of OUs). In addition, ER activities must be fully integrated with those of the Waste Management Program to allow for efficient consideration and provision of interim storage capacity requirements. A RFP Comprehensive Regulated Waste Management Planning Group was initiated in October 1993. A Comprehensive Regulated Waste Management Plan will be completed by October 1994

- Refine the approach by developing implementation plans, resource-loaded schedules, and associated detailed cost estimates. The revised ER approach is conceptual in nature and includes sufficient analysis to indicate the approach's viability, but the level of detail is not sufficient to commit to dates and details for IAG modifications. The regulators, DOE-HQ, DOE-RFO, and EG&G must be more involved in implementation planning; a solution to the waste disposal/storage issue must be resolved; a decision on future land use must be made; and additional analyses, (i.e., a work breakdown structure, resource allocation, critical path analysis, and probability risk assessment) must be conducted

- Intensify ongoing efforts to streamline RFP procedures for applicability to ER activities. Out of the detailed planning and implementation plans discussed above, there will come additional proposed actions to streamline procedures that appear to require tailoring for the ER Program.

APPENDIX A

32 IAG ISSUES OF THE QAT

Appendix A
32 Cross-Cutting Issues of the Quality Action Team

Issue	Options**					Action
	Do Nothing	Use Existing IAG Mechanism	Develop Informal Agreement	Develop New Enforceable Agreement	Renegotiate	
1. Exposure scenarios and reasonable maximum exposures (RME) need definition. Distinguish differences between RCRA and CERCLA with respect to risk assessments.			X			After EPA/CDH resolve risk assessment issues, EPA will finalize template.
2. Define land use requirements and their impacts.		X			X	DOE to finalize existing position, take to regulators and stakeholders.
3. Clarify and distinguish between "risk assessment" and "risk management."			X			DOE putting letter together on risk assessment and risk management, will send to regulators for review and comment.
4. IAG needs to account for Federal Facilities Compliance Act (FFCA) and its effect on stipulated penalties.		X				CDH to propose language to amend IAG to account for FFCA.
5. IAG needs to account for Community Environmental Restoration Facilities Act (CERFA) requirements.		X			X	EPA will coordinate with DOE to reach consensus on how to handle CERFA for RFP.
6. Account for OMB's statement that it is acceptable for DOE to provide reimbursable FTE for EPA non-oversite activities (refer to IAG, Part 30).	X	X				EPA to investigate OMB language and other recent actions, will make proposal to DOE.
7. Review need for NEPA in DOE's implementation of IAG.	X		X			DOE-RFO and DOE-HQ to prepare a position paper on NEPA in light of "reinventing government."
8. Review definition of parties to the IAG.					X	Each party should research their position. Each will then forward position to other parties. Further action depends on what positions are. EG&G will take lead to see if consensus can be reached between parties.
9. Review role of DOE contractors and their accountability for cleanup.					X	
10. Resolve inconsistency between RCRA Permit and IAG - i.e., "parties."					X	
11. Formalize change control documentation.			X			DOE to formalize change control and forward information to EPA/CDH.

Appendix A
32 Cross-Cutting Issues of the Quality Action Team

Issue	Options**					Action
	Do Nothing	Use Existing IAG Mechanism	Develop Informal Agreement	Develop New Enforceable Agreement	Renegotiate	
12. Clarify language on CDH vs. EPA "lead" agency on OUs (IAG Chapter 4) - RCRA and CERCLA always apply regardless of who is lead agency.			X			CDH to write letter clarifying "lead agency" for EPA/CDH joint signature. This letter will more fully explain regulatory jurisdiction.
13. Localize dispute resolution.					X	EPA to draft language for IAG change - issue must be addressed through renegotiation.
14. Formalize review times for documents - all parties.			X			EG&G to draft generic proposal.
15. Clarify role of Natural Resource Trustees.		X	X		X	DOE to draft language for IAG change - issue best addressed through renegotiation.
16. Resolve inconsistencies between OU work schedules.		X				EG&G to review and develop recommended changes for EPA/CDH review.
17. Clarify relationship among RCRA Closure, Corrective Action, and CERCLA.		X*			X	*Preferred - EPA/CDH will resolve this issue through effort already underway.
18. Clarify budget language (see QAT memo on budget issues).					X	See QAT Action Plan (9/22/93) for budget issues.
19. Expand language on ARARs; early definition may facilitate creative remedies.			X		X	EPA to establish working group including all parties to develop recommendations on ARARs template.
20. Risk assessment/baseline human health risk assessment (HHRA) section needs expanded language to ensure consistency between OUs.			X			EPA/CDH currently working issue - will propose compromise to DOE/EG&G.
21. Consider regrouping/repackaging industrial area OUs.		X*			X	*Preferred - EG&G/DOE has already opened dialogue with EPA/CDH. EG&G is formulating a proposal.
22. Update "Findings of Fact" section of IAG to reflect change in RFP mission.					X	DOE will draft proposed language.
23. Review magnitude of stipulated penalties.					X	Each party should develop position and bring to negotiating table.

Appendix A
32 Cross-Cutting Issues of the Quality Action Team

Issue	Options**					Action
	Do Nothing	Use Existing IAG Mechanism	Develop Informal Agreement	Develop New Enforceable Agreement	Renegotiate	
24. Revisit IAG assumptions with regard to work implementation.		X				EG&G/DOE review assumptions and evaluate against current operating conditions. Present to EPA/CDH.
25. Revisit schedule definition and milestones.		X			X	EG&G/DOE will propose changes to EPA/CDH.
26. Revisit schedule logic for consistency with text of IAG SOW.		X				EG&G/DOE will review and recommend changes to EPA/CDH (see item 17).
27. Allow creativity in expediting cleanup (timing and budget relationship).					X	DOE/EG&G will propose language for discussion with EPA/CDH.
28. Allow lesser degree of data collection before cleanup can begin.		X	X			Any party can propose this - will be considered on a case-by-case basis.
29. IAG should not preclude parcelization of RFP (early release from NPL and RCRA - see CERFA).		X			X	EPA to prepare and propose language (see item 5).
30. Clarify role of SSAB in IAG.		X	X		X	Based on input from the SSAB (CAB), parties will respond.
31. Account for D&D, transition, and deactivation in IAG.						DOE lead - 1. Arrive at a mutual understanding of D&D, transition, deactivation utilizing ongoing efforts in other forums. 2. Negotiate how to handle these items in IAG.

**Definition of Options

1. Proceed as we are now. No further action needed.
2. Change can be made using existing mechanisms in the IAG.
3. Change can be facilitated by informal agreements worked out by staff-level personnel (i.e., standard operating procedures, memoranda of understanding, etc.)
4. Change could be accomplished by amending current IAG with enforceable addenda, or new enforceable side agreements could be negotiated.
5. Renegotiate the IAG.

APPENDIX B

REMEDIAL DESIGN ACCELERATION PLAN OUTLINE

REMEDIAL DESIGN ACCELERATION PLAN OUTLINE

The following is intended to outline the basic steps necessary to accelerate the remedial design process at Rocky Flats. The premise of the plan to accelerate remedial design is two-fold: (1) utilize a design team approach to completing the remedial design with all appropriate regulatory reviews, and (2) eliminate the excessive review times that typically occur in the design review process.

- Using membership on the Citizens' Advisory Board or through discussions with the various stakeholders, devise a list of potential design team members. At a minimum, the team should consist of: RFP and the design contractor, EPA Region VIII and an oversight contractor, CDH and an oversight contractor, and community representatives

- Develop a work plan discussing the ground rules for how the design team will approach the task of completing the remedial design. This work plan would include tentative meeting times, where the meetings would be held, the roles of the individual team members and their organizations, and the function of the design team with respect to review and comment on various aspects of the design and timing of these reviews

- After the design team has reviewed the work plan, hold a kickoff meeting to discuss the work plan and initiate the design review process. Discuss the concept of eliminating the current "review and comment by mail" approach and replacing it with face-to-face meeting of the design team to review, comment, and approve changes to the design at the meetings. Reviews would occur at stages of the design determined to be appropriate for the specific project. This approach does away with arbitrary 30 percent, 60 percent, and 90 percent reviews.

APPENDIX C

MIXED WASTE HOT SPOT REMOVAL

MIXED WASTE HOT SPOT REMOVAL

Issue

Would it be better (faster, cheaper, safer) to remove mixed waste (MW) hot spots and store the excavated materials pending development of a long-term solution or to leave them in place?

Background

Currently, there are no treatment, storage, or disposal facilities permitted to receive MW from RFP. Although, Envirocare received their permit in October 1993, it is unclear whether the Envirocare facility would be available to the full spectrum of RFP MW. State closures (e.g., Idaho's refusal of waste shipments) and experience with the NTS and WIPP sites cast significant doubt on the ultimate viability of offsite, out-of-state disposal.

Recognizing the need for viable options, the Federal Facility Compliance Act of 1992 mandated that states develop MW site treatment plans by October 1995. After that date, all management of MW must comply with the plans. Prior to that time, sites can store MW in compliance with RCRA without obtaining permits. Based on past experience with low-level radioactive waste compacts, it is highly likely that plans will not be in place by the deadline and that extensions to the permit deferral will be made.

As a consequence, at least a two-year window exists during which federal facilities can remove and store MW without obtaining permits. In order to determine the efficacy of such a strategy, it is necessary to look at the impacts of the remove-and-store option as compared to those associated with leaving the materials in place.

Implications

There will be impacts associated with either option. In some cases, the impacts will be identical. More important are those impacts that are not shared between the alternatives and, therefore, differentiate them. These impacts are summarized in Table 1.

From a safety standpoint, the two options differ only in the timing of potential impacts unless there is reason to believe that removal will not ultimately be required. If removal is a likely part of any ROD, the same threat of release or exposure to workers exists at the time the excavation is accomplished. If removal is performed in conjunction with investigation activities, the number of workers at risk would be less because a different set of monitors and support staff would be used during a final remedy.

The remove-and-store option represents a clear risk reduction. By definition, hot spots pose elevated risk ($>10^{-4}$ level) either as a result of direct contact, infiltration, or resuspension of dust. The risk will remain unless some interim stabilization measure is performed. The remove-and-store option should dramatically reduce near-term risks because RCRA equivalent storage requires secondary containment and periodic monitoring. As a result there is a very low probability of a release and ample opportunity to mitigate releases before exposure could occur.

Table 1
Comparison of Impacts/Advantages of MW Management Options

Impact/Benefit	Hot spot Removal with Retrievable Storage	No Action
Worker, Downwind Receptor Safety	Impacts (if any), realized in near term	Impacts (if any), realized in long term
Health and Environmental Risk	Low-probability release event	Continued infiltration and/or resuspension
Cost	$2,000/yd^3/yr. storage and monitoring for period between removal and projected implementation of ROD. (Variations of treatment/storage for reduced residuals volume are possible.)	None, unless pressure mounts to implement increasingly more comprehensive surveys for new hot spots
Implementability	May exceed available storage capacity and require line item acquisition for new capital facility	May meet growing opposition from regulators resulting in imposed IM/IRAs
Advantages	Satisfies current bias for action and creates good will	Retains *in situ* treatment or containment option
	Leads to reduced risks in Baseline Risk Assessment, which improves chances for no further action or containment options in ROD	Avoids potential for duplicative removals if definition of hot spot is inadequate
	Retrievable storage could be converted to disposal remedy or long-term storage with potential for economic recovery as new technologies emerge	Allows time for revision/revocation of current time-consuming and costly work procedures
	Early release of property for economic development provides more time for development of new technical alternatives	

The remove-and-store option will clearly cost more. Storage/maintenance/monitoring costs are estimated at $2,000/yd^3/yr. If long storage periods are anticipated, there may be incentives to construct a soil-processing facility to reduce the volume that ultimately requires storage. As an example, a soil-washing facility has been identified as one means of reducing the volume stored.

The remove-and-store option may be difficult to implement, as current storage space may be inadequate for the volumes of contaminated soil anticipated. While storage capacity can be built, it would take 5 years to build it as a line-item capital facility, and it would take two years if capital funds were not required. The 5-year time frame would

eliminate the possibility for performance as an expedited action. Hence, a key to implementation will be a review of probable volumes and available storage capacity. Leaving the contamination in place may be increasingly problematic if regulators continue pressing for action and could result in additional demands for IM/IRAs imposed under the IAG.

The remove-and-store option offers a number of benefits. It clearly satisfies the current bias for action and could be a powerful move to gain public confidence and good will. The early action could also reduce overall costs as it would reduce the risk defined in the baseline risk assessment, thereby increasing the potential for an NFA ROD or containment of residuals. Without hot spot removal, baseline risks will remain high and there is a greater likelihood of an ROD requiring a substantive remedy across the entire IHSS and/or OU. If storage is designed for waste retrieval, it may be easier to convert to long-term storage or disposal in the future (i.e., retrievable storage may be a palatable interim step pending public acceptance of the reality of the need for onsite disposal). Waste retrieval would also accommodate ultimate recovery of resources or future treatment as new technologies emerge. In the interim, stored soils would provide an inventory of material to support research and development activities. Hot spot removal could lead to early release of property for economic development

Potential benefits derived from not removing hot spots are derived from uncertainty over the ultimate remedy. If *in situ* or containment approaches are likely to be the remedies of choice, hot spot removal will have foreclosed those options. Similarly, if the definition of hot spot has been insufficiently encompassing, final remedy may require remobilization for a second round of removals. Deferral also provides time for D&D, consolidation and/or offsite shipment of SNM, restructuring of the PA, and other activities that could reduce the present work procedure requirements, which would have a significant effect on the time and cost of removal actions.

APPENDIX D

SUMMARY OF PLANNING INFORMATION BY IHSS

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
1	102 Oil Sludge Pit	None	PEA														Done
1	103 Chemical Burial	HVO	Traditional RI/FS														Buffer 80'x30'x5' 444 cy
1	104 Liquid Dumping	HVO	Traditional RI/FS														Buffer 20'x20'x5' 74 cy
1	105.1 Out-of-Service Fuel Tank - Westernmost	Completely Excavated During F.O. Construction	NFA														
1	105.2 Out-of-Service Fuel Tank - Easternmost	Completely Excavated During F.O. Construction	NFA														
1	106 Outfall	None	PEA														Done
1	107 Hillside Oil Leak	HVO	Traditional RI/FS														Buffer 50'x100'x5' 826 cy

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
1	119.1 Multiple Solvent Spills - West Area																
	Source	HVO	PEA						X	X							75'x100'x50'
	Hotspot	MW	NFA														Done 3x1'x1'x5'
	GW	MW	Traditional RI/FS														5gpm
1	119.2 Multiple Solvent Spills - East Area	MW															
	Hotspot	MW	NFA														Done 1x1'x1'x5'
	GW	MW	Traditional RI/FS														2gpm
1	130 Radioactive Site - 800 Area Site #1	MW	Traditional RI/FS														2gpm
1	145 Sanitary Waste Line Leak	None	PEA							X							Done
1	Other 7/x Aeration/Tilling	HAZ	Traditional RI/FS							X							40 acres

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable) 1 2 3 4 5 6 7 8 9 10 11 12 13	Number / Area / Volume (Per Remedy)

Prospective Remedy Key

1 Hot Spot Removal/NFA
2 Hot Spot Removal/Cap
3 Remove & Store/Dispose
4 GW Pump & Treat
5 Cap/Soil Cover
6 Soil Vapor Extraction
7 Innovative Treatment (Provide Scope)
8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class
Hazardous - Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category
No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (Traditional RI/FS)
Transition/D&D (T/D&D)

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
2	108 Trench T-1	MW	PEA			X											125 drums 95' x 10' x 10' 352 cy
2	109 Trench T - 2																
	GW	MW	Traditional RI/FS														Soils: 3515 cy
	Soil	MW	PEA			X											50' x 10' x 10' Solids: 185 cy
2	110 Trench T - 3																
	GW	MW	Traditional RI/FS														Soils: 2267
	Soil	MW	PEA			X											90' x 10' x 10' Solids: 333 cy
2	111.1 Trench T - 4																
	GW	MW	Traditional RI/FS														Soils: 2830
	Soil	MW	PEA			X											100' x 10' x 10' Solids: 370 cy
2	111.2 Trench T - 5 Soil	MW	PEA					X									90' x 10' x 10' 900 sf
2	111.3 Trench T - 6 Soil	MW	PEA					X									50' x 10' x 10' 500 sf

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
2	111.4 Trench T - 7 Soil	MW	PEA					X									95' x 10' x 10' 950 sf
2	111.5 Trench T - 8 Soil	MW	PEA					X									60' x 10' x 10' 600 sf
2	111.6 Trench T - 9 Soil	MW	PEA					X									275' x 10' x 10' 2750 sf
2	111.7 Trench T 10		Traditional RI/FS														Soils: 1230 cy
	GW Soil	MW															
		MW	PEA			X											75' x 10' x 10' Solids: 370 cy
2	111.8 Trench T - 11		Traditional RI/FS														Soils 1530 cy
	GW Soil	MW															
		MW	PEA			X											100' x 10' x 10' Solids: 370 cy
2	112 903 PAD Drum Storage		Traditional RI/FS														gallons
	GW Soil	MW															
		MW	NFA														0

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
2	113 Mound Area		Traditional RI/FS														gallons
	GW	MW															
	Soil	MW	NFA														
2	140 Reactive Metal Destruction Site	MW	Traditional RI/FS														24,600 cy
2	153 Oil Burn Pit No. 2	MW	Traditional RI/FS														2400 cy
2	154 Pallet Burn Site	MW	Traditional RI/FS														0
2	155 903 Lip Area	MW	Traditional RI/FS														41,000 cy
2	183 Gas Detoxification Area	HAZ	Traditional RI/FS														0
2	216.2 East Spray Fields Center Area	HAZ	NFA														

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
2	216.3 East Spray Fields South Area	HAZ	NFA														
Other than IHSS contamination																	

Prospective Remedy Key

1 Hot Spot Removal/NFA
2 Hot Spot Removal/Cap
3 Remove & Store/Dispose
4 GW Pump & Treat
5 Cap/Soil Cover
6 Soil Vapor Extraction
7 Innovative Treatment (Provide Scope)
8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class

Hazardous- Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category

No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (Traditional RI/FS)
Transition/D&D (T/D&D)

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
3	199 Contamination of the Land Surface	RAD	NFA														
3	200 Great Western Reservoir	MW	PEA										X				< 150 Acres 18" Sed. Thick
3	201 Standley Reservoir	MW	NFA														
3	202 Mower Reservoir	MW	NFA														
FS completed end of FY94 --- DD begins FY95																	

Prospective Remedy Key

1 Hot Spot Removal/NFA
2 Hot Spot Removal/Cap
3 Remove & Store/Dispose
4 GW Pump & Treat
5 Cap/Soil Cover
6 Soil Vapor Extraction
7 Innovative Treatment (Provide Scope)
8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class

Hazardous - Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category

No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (Traditional RI/FS)
Transition/D&D (T/D&D)

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
4	101 207 Solar Evaporation Ponds		Traditional RI/FS														310,360 sf 7 acres

Prospective Remedy Key

1 Hot Spot Removal/NFA
2 Hot Spot Removal/Cap
3 Remove & Store/Dispose
4 GW Pump & Treat
5 Cap/Soil Cover
6 Soil Vapor Extraction
7 Innovative Treatment (Provide Scope)
8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class

Hazardous- Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category

No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (Traditional RI/FS)
Transition/D&D (T/D&D)

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
5	115 Original Landfill	MW	Traditional RI/FS														
5	133.1 Ash Pit 1-1	RAD	PEA	X				X			X						9.2 acres
5	133.2 Ash Pit 1-2	RAD	PEA	X				X			X						See IHSS 133.1
5	133.3 Ash Pit 1-3	RAD	PEA	X				X			X						See IHSS 133.2
5	133.4 Ash Pit 1-4	RAD	PEA	X				X			X						See IHSS 133.3
5	133.5 Incinerator	RAD	NFA														
5	133.6 Concrete Wash Pad	None	NFA														

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
5	142.10 C1 Pond	RAD	T/D&D														
5	142.11 C2 Pond	RAD	T/D&D														
5	209 Surface Disturbance Southeast of Building 881	None	NFA														

Prospective Remedy Key

1 Hot Spot Removal/NFA
2 Hot Spot Removal/Cap
3 Remove & Store/Dispose
4 GW Pump & Treat
5 Cap/Soil Cover
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7 Innovative Treatment (Provide Scope)
8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class

Hazardous- Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category

No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (LT RI/FS)
Transition/D&D (T/D&D)

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
6	141 Sludge Dispersal	MW	PEA	X													7,000 cy
6	142.1 A-1 Pond	MW	Traditional RI/FS														
6	142.2 A-2 Pond	MW	Traditional RI/FS														
6	142.3 A-3 Pond	MW	Traditional RI/FS														
6	142.4 A-4 Pond	MW	Traditional RI/FS														
6	142.5 B-1 Pond	MW	Traditional RI/FS														
6	142.6 B-2 Pond	MW	Traditional RI/FS														

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
6	142.7 B-3 Pond	MW	Traditional RI/FS														
6	142.8 B-4 Pond	MW	Traditional RI/FS														
6	142.9 B-5 Pond	MW	Traditional RI/FS														
6	142.12 Newly Identified A-5 Pond	MW	Traditional RI/FS														
6	143 Old Outfall	MW	PEA	X													900 cy
6	156.2 Soil Dump Area	MW	PEA	X													45,000 cy
6	165 Triangle Area	MW	PEA	X													30,000 cy

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
6	166.1 Trench A		NFA														
6	166.2 Trench B		NFA														
6	166.3 Trench C		NFA														
6	167.1 North Area	MW	PEA			X											30,000 cy
6	167.2 Pond Area	MW	PEA			X											3,500 cy
6	167.3 South Area	MW	PEA			X											14,000 cy
6	196 Water Treatment Plant	HAZ	Traditional RI/FS														

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
6	216.1 North Area	MW	PEA			X											4,000 cy

Prospective Remedy Key

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8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class

Hazardous- Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category

No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (LT RI/FS)
Transition/D&D (T/D&D)

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
7	114 Present Landfill	MW	PEA		X		X	X				X	X				per Meeker
7	203 Inactive Hazardous (HAZ) Waste Storage Area	MW	NFA														per Meeker
additional geophysical surveys trenches																	

Prospective Remedy Key

1 Hot Spot Removal/NFA
2 Hot Spot Removal/Cap
3 Remove & Store/Dispose
4 GW Pump & Treat
5 Cap/Soil Cover
6 Soil Vapor Extraction
7 Innovative Treatment (Provide Scope)
8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class

Hazardous- Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category

No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (LT RI/FS)
Transition/D&D (T/D&D)

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
8	118.1 Multiple Solvent Spills - West of Building 730	HVO	PEA			X		X	X								25' x 40' x 5' Above Ground Tank (5,000 gallon)
8	118.2 Multiple Solvent Spills - South End of Building 776	HVO	PEA			X					X						30' x 20' x 5' 111 cy
8	123.1 Valve Vault 7	HVO	PEA			X					X						400' x 25' x 2' 1,852 cy
8	135 Cooling Tower Blowdown	MW	PEA			X		X			X						100' x 60' x 10' 1,111 cy
8	137 Cooling Tower Blowdown - Building 774	HAZ	NFA														140' x 100'
8	138 Cooling Tower Blowdown - Building 779	MW	PEA			X		X			X						50' x 50' x 10' 463 cy
8	139.1 Caustic/Acid Spills - Hydroxide Tank Area	HAZ	PEA			X					X				X		N 25' x 25' x 5' 116 cy S 35' x 25' x 5' 162 cy Tank 65' x 35'

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
8	139.2 Caustic/Acid Spills - Hydrofluoric Acid Tanks	HAZ	PEA								X						40' x 25'
8	144 Sewer Line Break	MW	T/D&D														N 25' x 70' S 15' x 170'
8	150.1 Radioactive Liquid Leaks - North of Building	MW	T/D&D														60' x 360'
8	150.2 Radioactive Liquid Leaks - West of Building	RAD	T/D&D														680' x 90'
8	150.3 Radioactive Liquid Leaks - Between Buildings 771 & 774	RAD	T/D&D														150' x 30'
8	150.4 Radioactive Liquid Leaks - East of Building 750	MW	PEA		X						X						20' x 20' x 5'

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
8	150.6 Radioactive Liquid Leaks - South of Building 779	MW	T/D&D														125' x 180'
8	150.7 Radioactive Liquid Leaks - South of Building 776	RAD	T/D&D														370' x 130'
8	150.8 Radioactive Liquid Leaks - Northeast of Building 779	MW	T/D&D														Combined into IHSS 150.6
8	151 Fuel Oil Leak	HAZ	PEA		X				X		X				X		60' x 45' x 5' 1 Tank 500 cy
8	163.1 Radioactive Site - 700 Area Wash Area	MW	PEA		X						X						50' x 125'
8	163.2 Radioactive Site - 700 Area Buried Slab	RAD	PEA	X		X					X						60' x 40' x 5' 444 cy
8	172 Central Avenue Waste Spill	MW	T/D&D														4350' x 60'

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
8	173 Radioactive Site - 900 Area	MW	T/D&D														125' x 40'
8	184 Building 991 Steam Cleaning Area	RAD	PEA	X				X			X						50' x 70'
8	188 Acid Leak	HAZ	PEA	X							X						110' x 65'

Prospective Remedy Key

1 Hot Spot Removal/NFA
2 Hot Spot Removal/Cap
3 Remove & Store/Dispose
4 GW Pump & Treat
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6 Soil Vapor Extraction
7 Innovative Treatment (Provide Scope)
8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class

Hazardous- Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category

No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (Traditional RI/FS)
Transition/D&D (T/D&D)

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
9	121 Original Process Waste Lines																7 miles of Process Pipe
	121.T 40 Tanks		PEA								X				X		40 Tanks
	121.P1 400/800 Area Piping		Traditional RI/FS														
	121.P2 Remaining Piping		Traditional RI/FS														
9	122 Underground Concrete Tank	Bldg. 441 HAZ	PEA												X		1 Tank
9	123.2 Valve Vault West of Building 707	MW	Traditional RI/FS														50' x 40'
9	124.1 Radioactive Liquid Waste Storage Tank - 30,000 Gallon Tank (T-68, Unit 55.14)	MW	PEA												X		1 Tank

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
9	124.2 Radioactive Liquid Waste Storage Tank - 14,000 Gallon Tank (T-66, Unit 55.15)	MW	PEA												X		2 Tanks
9	124.3 Radioactive Liquid Waste Storage Tank - 14,000 Gallon Tank (T-67, Unit 55.16)	MW	PEA												X		2 Tanks
9	125 Holding Tank	MW	PEA												X		1 Tank
9	126.1 Out-of-Service Process Waste Tanks - Westernmost Tanks	MW	PEA												X		1 Tank
9	126.2 Out-of-Service Process Waste Tanks - Easternmost Tanks	MW	PEA												X		1 Tank

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
9	127 Low-Level Radioactive Waste Leak	MW	Traditional RI/FS														60
9	132 Radioactive Site - 700 Area	MW	PEA												X		4 Tanks
9	146.1 Concrete Process Waste Tanks 7,500 Gallon Tank (#31)	MW	PEA (Wash out)								X		X				1 Tank
9	146.2 Concrete Process Waste Tanks 7,500 Gallon Tank (#32)	MW	PEA (Wash out)								X		X				1 Tank
9	146.3 Concrete Process Waste Tanks 7,500 Gallon Tank (#34W)	MW	PEA (Wash out)								X		X				1 Tank
9	146.4 Concrete Process Waste Tanks 7,500 Gallon Tank (#34E)	MW	PEA (Wash out)								X		X				1 Tank

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
9	146.5 Concrete Process Waste Tanks 3,750 Gallon Tank (#30)	MW	PEA (Wash out)								X		X				1 Tank
9	146.6 Concrete Process Waste Tanks 3,750 Gallon Tank (#33)	MW	PEA (Wash out)								X		X				1 Tank
9	147.1 Process Waste Leaks-Maas Area	MW	Traditional RI/FS														40' x 190'
9	149 Effluent Pipe	MW	Traditional RI/FS														650
9	159 Radioactive Site Building 559	MW	Traditional RI/FS														30' x 150'

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
9	215 Unit 55.13 - Tank T - 40	MW	PEA (Wash out)								X						1 Tank

Prospective Remedy Key

1 Hot Spot Removal/NFA
2 Hot Spot Removal/Cap
3 Remove & Store/Dispose
4 GW Pump & Treat
5 Cap/Soil Cover
6 Soil Vapor Extraction
7 Innovative Treatment (Provide Scope)
8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class
Hazardous- Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category
No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (Traditional RI/FS)
Transition/D&D (T/D&D)

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
10	129 Oil Leak	MW	T/D&D														55' x 20'
10	170 P.U. & D. Storage Yard - Waste Spills	MW	PEA	X				X			X						1000' x 250' 250,000 sf
10	174 P.U. &D. Container Storage Facilities (2)	MW	PEA	X				X			X						A 10' x 10' B 5' x 5' 125 sf
10	175 S&W Bldg. 980 Container Storage Facility	MW	PEA		X						X						40' x 40'
10	176 S&W Contractor Storage Yard	MW	PEA		X						X						300' x 400'
10	177 Building 885 Drum Storage Area	MW	T/D&D														60' x 20'
10	181 Building 334- Cargo Container Area	MW	PEA	X							X						30' x 20'
10	182 Building 444/453 - Drum Storage Area	MW	PEA		X						X						40' x 45'

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
10	205 Building 460 Sump #3 Acid Side	HAZ	PEA		X	X					X						35' x 30' x 5' 194 cy
10	206 Inactive D-836 Hazardous (HAZ) Waste Tank	MW	T/D&D														35' x 10'
10	207 Inactive 444 Acid Dumpster	MW	PEA								X						10' x 10'
10	208 Inactive 444/447 Waste Storage Area	HAZ	PEA		X						X						20' x 25'
10	210 Unit 16, Building 980 Cargo Container	HAZ	PEA			X		X			X						30' x 30' x 5' 167 cy
10	213 ** Unit 15, 904 PAD Pondcrete Storage	RAD	T/D&D														450' x 300'
10	214** Unit 25, 750 PAD Pondcrete and Saltcrete Storage	RAD	T/D&D														400' x 500'
*** These IHSSs may be transferred to OU4, to support the OU4 IM/IRA.																	

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	

Prospective Remedy Key

1 Hot Spot Removal/NFA
2 Hot Spot Removal/Cap
3 Remove & Store/Dispose
4 GW Pump & Treat
5 Cap/Soil Cover
6 Soil Vapor Extraction
7 Innovative Treatment (Provide Scope)
8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class

Hazardous- Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category

No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (Traditional RI/FS)
Transition/D&D (T/D&D)

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
11	168 West Spray Field	HAZ	PEA	X			X				X						20 Drums

Propsective Remedy Key

1 Hot Spot Removal/NFA
2 Hot Spot Removal/Cap
3 Remove & Store/Dispose
4 GW Pump & Treat
5 Cap/Soil Cover
6 Soil Vapor Extraction
7 Innovative Treatment (Provide Scope)
8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class

Hazardous- Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category

No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (Traditional RI/FS)
Transition/D&D (T/D&D)

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
12	116.1 Multiple Solvent Spills West Loading Dock Area	MW	PEA		X	X					X						100' x 50' x 5' 926 cy
12	116.2 Multiple Solvent Spills South Loading Dock Area	MW	PEA		X	X					X						40' x 30' x 5' 222 cy
12	120.1 Fiberglassing Areas North of Building 664	MW	PEA		X	X					X						60' x 90' x 5' 1000 cy
12	120.2 Fiberglassing Areas West of Building 664	MW	PEA		X	X					X						45' x 150' x 5' 1250 cy
12	136.1 Cooling Tower Ponds Northeast Corner of Building 460	MW	PEA	X							X			X			50' x 75' x 5'
12	136.2 Cooling Tower Ponds West of Building 460	MW	PEA	X							X			X			35' x 185' x 5'

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
12	147.2 Process Waste Leaks Owen Area	RAD	PEA	X							X						75' x 130'
12	157.2 Radioactive Site South Area	MW	PEA	X							X						750' x 600'
12	187 Acid Leaks (2)	HAZ	NFA								X						665' x 25'
12	189 Multiple Acid Spills	HAZ	NFA								X						80' x 190'

Prospective Remedy Key

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2 Hot Spot Removal/Cap
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4 GW Pump & Treat
5 Cap/Soil Cover
6 Soil Vapor Extraction
7 Innovative Treatment (Provide Scope)
8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class
Hazardous- Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category
No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (Traditional RI/FS)
Transition/D&D (T/D&D)

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
13	117.1 Chemical Storage North Site	MW	T/D&D														320' x 300'
13	117.2 Chemical Storage Middle Site	MW	T/D&D														160' x 510'
13	117.3 Chemical Storage South Site	HVO/MW	PEA						X		X		X *				170' x 270' 45,900 sf
13	128 Oil Burn Pit No. 1	HVO/MW	PEA								X						90' x 75'
13	134 Lithium Metal Destruction Site	HVO	Traditional RI/FS														100' x 190'
13	148 Waste Spills	MW/HAZ	T/D&D														100' x 190' 0 cy
13	152 Fuel Oil Tank	HVO	PEA								X						180' x 300'

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
13	157.1 Radioactive Site North Area	MW	Traditional RI/FS														200' x 520' 0 cy
13	158 Radioactive Site - Building 551	RAD	PEA		X						X						200' x 275'
13	169 Waste Drum Peroxide Burial	HAZ	NFA														25' x 50'
13	171 Solvent Burning Ground	MW	PEA	X							X						210' x 10'
13	186 Valve Vault 12	MW	Traditional RI/FS														40' x 650' 0 cy
13	190 Caustic Leak	HAZ	NFA														10' x 5,500'
13	191 Hydrogen Peroxide Spill	HAZ	NFA														See 191

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
13	197 Scrap Metal Sites	MW	T/D&D														500' x 300'

** If no Rads are found tank, record possibility of LL contamination under tank in case of property transfer

Prospective Remedy Key

1 Hot Spot Removal/NFA
2 Hot Spot Removal/Cap
3 Remove & Store/Dispose
4 GW Pump & Treat
5 Cap/Soil Cover
6 Soil Vapor Extraction
7 Innovative Treatment (Provide Scope)
8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class

Hazardous- Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category

No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (Traditional RI/FS)
Transition/D&D (T/D&D)

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
14	131 Radioactive Site - 700 Area	MW	T/D&D														10' x 50'
14	156.1 Radioactive Soil Burial Building 334 Parking Lot	MW	Traditional RI/FS														370' x 180' x 5' 12,300 cy
14	160 Radioactive Site - Building 444 Parking Lot	MW	Traditional RI/FS														280' x 375' x 5' 19,400 cy
14	161 Radioactive Site - Building 664	MW	T/D&D														150' x 180'
14	162 Radioactive Site - 700 Area Site #2	MW	T/D&D														50' x 1,400'
14	164.1 Radioactive Site - 800 Area #2 Concrete Slab	RAD	Traditional RI/FS														40' x 75' x 5' 600 cy
14	164.2 Radioactive Site - 800 Area #2 Building 886 Spills	RAD	T/D&D														250' x 250'

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
14	164.3 Radioactive Site - 800 Area #2 Building 889 Storage Pad	RAD	PEA			X											250' x 100' x 5' 4,630 cy
Timing will be dependent upon transition/D&D & integrated accordingly																	

Prospective Remedy Key

1 Hot Spot Removal/NFA
2 Hot Spot Removal/Cap
3 Remove & Store/Dispose
4 GW Pump & Treat
5 Cap/Soil Cover
6 Soil Vapor Extraction
7 Innovative Treatment (Provide Scope)
8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class

Hazardous- Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category

No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (Traditional RI/FS)
Transition/D&D (T/D&D)

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
15	178 Building 881 Drum Storage Area	MW	NFA														
15	179 Building 865 Drum Storage Area	MW	NFA														
15	180 Building 883 Drum Storage Area	MW	NFA														
15	204 Original Uranium Chip Roaster	MW	NFA														
15	211 Unit 26, Building 881 Drum Storage	MW	NFA														
15	217 Unit 32, Building 881, CN- Bench Scale Treatment	MW	PEA			X											1 Chem Hood

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	

Prospective Remedy Key

1 Hot Spot Removal/NFA
2 Hot Spot Removal/Cap
3 Remove & Store/Dispose
4 GW Pump & Treat
5 Cap/Soil Cover
6 Soil Vapor Extraction
7 Innovative Treatment (Provide Scope)
8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class

Hazardous- Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category

No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (Traditional RI/FS)
Transition/D&D (T/D&D)

Operable Unit	IHSS	Likely Contaminated Class	Disposition Category	Prospective Remedy (List All Applicable)													Number / Area / Volume (Per Remedy)
				1	2	3	4	5	6	7	8	9	10	11	12	13	
16	185 Solvent Spills	HVO	NFA														
16	192 Antifreeze Discharge	HVO	NFA														
16	193 Steam Condensation Leak	HVO	NFA														
16	194 Steam Condensation Leak	RAD	NFA														
16	195 Nickel Carbonyl Disposal	HAZ	NFA														

Prospective Remedy Key

1 Hot Spot Removal/NFA
2 Hot Spot Removal/Cap
3 Remove & Store/Dispose
4 GW Pump & Treat
5 Cap/Soil Cover
6 Soil Vapor Extraction
7 Innovative Treatment (Provide Scope)
8 Limited Field Investigation (Provide Scope)
9 Water Diversion
10 Institutional Control (Provide Scope)
11 Stabilization/Solidification
12 Tank Pull
13 Grout in Place

Likely Contaminated Class
Hazardous- Volatile Only (HVO)
Hazardous (HAZ)
Radioactive (RAD)
Mixed Waste (MW)

Disposition Category
No Further Action (NFA)
Potential Early Action (PEA)
Traditional RI/FS (Traditional RI/FS)
Transition/D&D (T/D&D)

APPENDIX E

SITEWIDE IM/IRA for EARLY ACTIONS

1.0 INTRODUCTION

The purpose of this appendix is to evaluate the implementation of IM/IRAs at Rocky Flats. The objective of the evaluation is to identify means to expedite the IM/IRA process and to propose actions that may be implemented under IM/IRAs.

The IM/IRA process may be used as a means to rapidly complete remedial actions at RFP, reducing or eliminating a potential threat to human health and the environment. The term IM/IRA is a combination of the RCRA Interim Measure and CERCLA Interim Remedial Action as defined by the IAG. The term IM/IRA is defined in the IAG; therefore, any action taken under an IM/IRA is action taken under the IAG. The term can refer to an action, a process, and/or a document. The actions are taken to reduce the immediate risk of hazardous material release to the environment and the public in an accelerated fashion.

IM/IRAs are accelerated by limiting the number and scope of required documents and by limiting the number and duration of reviews.

2.0 THE IM/IRA PROCESS

IM/IRAs generally consist of issuance of a Decision Document, which is considered equivalent to a ROD. The IM/IRA requirements are outlined in the preamble to the NCP (55 FR 8704, March 8, 1990). This states that the proposed IM/IRA Decision Document shall be a concise document that:

- Indicates the objective of the IM/IRA
- Discusses alternatives, if any, that were considered
- Provides a rationale for the alternative selected
- Presents EPA with an approved applicable or relevant and appropriate requirement (ARAR) analysis
- Discusses how the interim remedy selected will be consistent with the final remedy for the OU

This brief document replaces the more formal RI/FS process and utilizes existing data and reports, where possible, to support the proposed action. A risk analysis may be performed at the discretion of the parties. The alternative analysis is focused on a few potential actions.

Following approval of the Decision Document, an Implementation Document is prepared, which contains drawings, specifications, and costs for the proposed project. Additional data that may be required as part of the implementation are often gathered as part of final design. Upon approval of the Implementation Document, remediation is completed. Occasionally, further monitoring of the performance of the completed IM/IRA action is necessary.

2.1 Existing IAG Process

IM/IRAs may be proposed by any of the parties (DOE, EPA, and CDH).

The existing IM/IRA process at RFP as specified in Section I.B.10 of the IAG is as follows:

(1) Prepare a draft Proposed Decision Document.
(2) Submit the draft proposed decision document for review by the State and EPA.
(3) Prepare a Proposed Decision Document with EPA and the State comments and DOE responses to comments.
(4) Submit the Proposed Decision Document for review by the State, EPA, and the public with public hearings, if requested (60-day minimum comment period).
(5) Prepare a final IM/IRA Decision Document with EPA, State, and public comments and DOE responses to comments.
(6) Obtain EPA and State review and approval.
(7) Prepare an EPA-and State-approved final IM/IRA Decision Document and Responsiveness Summary.
(8) A 10-day waiting period is observed prior to commencing any field remedial/corrective activities.
(9) Complete engineering design work.
(10) Issue an IM/IRA Implementation Document.
(11) The EPA and State review the Implementation Document/potential dispute resolution.
(12) Implement remedial action with monthly progress reports to EPA and State.

There are a number of problems with the IM/IRA process as it is defined in the IAG, particularly in relation to review and approval requirements. Although IM/IRAs are intended to be expedited actions, the document review requirements in the IAG are not conducive to rapid program implementation. Specific time limitations are not provided in Section I.B.10 for completion of documents or reviews. Section I.B.4 of the IAG places a time limit for review and comment on draft and final reports requiring that 60 days from receipt of comments from EPA and CDH, DOE must produce a revised document. No time limitations are placed upon EPA and the State for providing comments. Including time for internal reviews, the process from production of a draft Decision Document (Step 1) to completion of an approved final Decision Document (Step 7) may take more than one year. Typical actions require two years or more to complete.

It should also be noted that this section of the IAG contains the following language that may be interpreted by some that IM/IRAs are limited by OU boundaries, "The proposed IM/IRA Decision Document...discusses how the interim remedy selected will be consistent with the final remedy for the OU." (p. 10)

Under the current process, the regulators, not DOE, make the final decision on the action to be taken. Under RCRA and CERCLA, the lead agency (usually DOE) would make the decision subject to regulator approval.

2.2 Rocky Mountain Arsenal IRA Process

The IRA process has been successfully used at the Rocky Mountain Arsenal (RMA) Superfund site (also in the Denver area and within EPA Region VIII) to complete expedited remedial actions. Some of the methods used to execute IRAs at the RMA may be transferable to the program at RFP.

The general IRA process at the RMA is described in Section XXII, paragraphs 22.5 through 22.15 of the Federal Facility Agreement (FFA), which defines the following sequence and timing:

(1) Prepare a draft Alternatives Assessment Document (includes proposed ARARs that are subject to dispute resolution).
(2) Submit the draft Alternatives Assessment Document for review by the other organizations (Army, Shell, and EPA) and the U.S. Department of the Interior (DOI). The comment period is closed after 30 days from receipt of the document.
(3) Prepare and submit a final Alternatives Assessment Document within 30 days of close of the comment period.
(4) Issue the proposed Decision Document "promptly after issuance" of the final Alternative Assessment Document.
(5) Submit the Proposed Decision Document for review by the other organizations (Army, Shell, and EPA), the DOI, and by the public (including a public meeting). The comment period is 30 days or less depending upon the "exigencies of the situation."
(6) Issue a draft final IRA Decision Document with responses to comments promptly after the close of the comment period.
(7) Invoke dispute resolution within 20 days of issuance of the draft final Decision Document.
(8) Issue a final IRA Decision Document after close of the 20-day dispute resolution period or after resolution of dispute.
(9) Complete engineering design work.
(10) Issue a draft IRA Implementation Document for review and comment by the organizations and DOI.
(11) Dispute resolution if required.
(12) Issue final IRA Implementation Document.
(13) Implement remedial action keeping the other organizations and appraise DOI of progress.

Although not part of the FFA, a number of additional methods have evolved through implementation of IRAs that have been used to expedite execution. Meetings with all parties at the project onset are used to minimize comments and disputes. Fines may be imposed for failure to meet certain deadlines. For example, failure to meet the milestone deadlines as a result of failure to perform can result in $10,000 per day fines. A preliminary engineering document is issued prior to production of the draft IRA

Implementation Document. This document contains the basic assumptions used for engineering design, proposed methodologies for implementation, and preliminary engineering drawings (well locations, pipeline routes, cap design, process diagrams, materials balance, etc.). The preliminary engineering document has been used as a substitute for 30 percent and 60 percent design reviews often required by the Army.

Three milestone events occur in the process: issuance of a Proposed Decision Document (Step 5), issuance of the Implementation Document for review and comment, and completion of construction. Completion of remedial actions in the field are expedited by monetary incentive awards to craft labor for safe work, quality of work, and meeting deadlines.

The FFA Alternatives Assessment Document, which is a subsection of the Decision Document produced under the IAG IM/IRA process, is a separate document that does not undergo formal public review. The rationale behind separation is to allow for internal consensus of the organizations (Army, EPA, and Shell) on potentially contentious issues such as ARARs and alternatives selection prior to public review and comment. The Decision Document is a brief, formal document that presents the objectives of the IRA, summarizes the alternatives analysis, presents ARARs, summarizes significant comments and responses, and provides a schedule for implementation.

One organization becomes the lead party for an IRA. Each organization usually assigns one person for management of IRAs at the RMA. These persons are responsible for ensuring that reviews and implementation within their respective organizations are completed on time (or extensions requested), coordinating with other organizations is completed, identifying potential items for dispute is performed, and participating in dispute resolution. When necessary, IRA managers bring major issues to the attention of the RMA Committee for resolution. Managers are responsible for seeing IRAs from conception though completion of construction.

The FFA also recognizes that the IRA process must be flexible. Any organization may nominate an IRA subject to acceptance of the majority. Prior to the issuance of a ROD for an OU, any organization may request additional action or modification of any IRA because of information that was not available or conditions that were not known at the time of the issuance of the Final Decision Document.

In contrast to the IM/IRA process specified by the IAG at RFP, the IRA process at the RMA has strict limits on the time permitted for review and comment and, in some cases, dispute. Regulatory agencies (such as EPA) are held to the same deadlines as the other parties. Deadline extensions may be granted by agreement of all parties. The alternative selection is made by the Lead Party rather than EPA and State. Disagreements regarding selection may enter dispute.

2.3 IM/IRA Decision Document Format

IM/IRA Decision Documents are prepared by DOE or their contractors. The regulators work very closely with RFP from the beginning to develop each document. Typically, the Decision Document are about 150 to 250 pages when the final Decision Document

is issued. The appendices and related design information may increase the document size to over 1,000 pages.

To-date, RFP has written, and the regulators have approved, four IM/IRA Decision Documents, and all of them have different outlines and address different subject areas. In three out of four cases, the IM/IRA was published concurrently with an Environmental Assessment. The completed IM/IRA Decision Documents are for the following areas:

- OU1 - 881 Hillside Area, January 1990
- OU2 - Surface Water, South Walnut Creek Basin, March 1991
- OU4 - Solar Evaporation Ponds, April 1992
- OU2 - Subsurface Water, September 1992

These IM/IRAs are in various stages of completion. The four regulator-approved outlines for IM/IRAs at RFP are different. They all cover the minimum required material. Some subjects, such as risk assessment, are only addressed in a few.

3.0 Recommendations

Key issues that should be addressed as part of modification of the IM/IRA process contained in the IAG are the following:

- The existing IM/IRA process should be redesigned for rapid implementation without extensive reviews. Comment duration should be restricted to time limits. All parties should be bound by the same time limits
- IM/IRAs should not be restricted by OU boundaries to take advantage of economies of scale
- Risk assessment should only be used as necessary in decision documents and not be a formalized requirement
- DOE should propose the preferred alternative for approval by EPA and the State
- The IM/IRA process as defined in the IAG should be modified by issuance of a Memorandum of Agreement or by revision of the IAG itself. The Memorandum of Agreement approach would be the most expeditious in that the revision of the IM/IRA process would not be delayed by settlement of other revisions. The Memorandum of Agreement could be incorporated as part of a modified IAG at a later date

Additional recommendations for improving the execution of IM/IRAs are the following:

- The format used for decision documents in the past is more appropriate for feasibility studies and should be streamlined
- Submittal and review of engineering documents for execution of IM/IRAs should be restricted to a preliminary engineering document and implementation document rather than Title I and II engineering documents
- Any remedy selected under an IM/IRA must come as close as possible (as judged by the regulators) to meeting the ARARs without determining or interfering with the

final remedy. If DOE chooses to implement institutional controls for the site, the site may be remediated to a cleaner level that will ultimately be required

4.0 Specific Examples of Potential PEA IM/IRA Candidates

Examples of PEA candidates for remedial action under the IM/IRA process include these items:

- Soil Hot Spot Removal: This action consists of the removal of small volumes (less than 5 cubic yards) of higher concentration soil contaminants
- Soil Removal/Capping: This action consists of removal of larger volumes (greater than 5 cubic yards) of higher concentration soil contaminants
- Cyanide Hood Removal: This action consists of the removal of the cyanide hood in Building 559. The hood will be dismantled and shipped to a RCRA-permitted hazardous waste treatment, storage, and disposal facility
- Chemical Sewers: This action consists of the isolation, removal, and grouting of the chemical sewers (sections 700 and 800)
- Surface Water Treatment: This action consists of the implementation of Best Management Practices at selected sites for reduction in surface water transport of potentially contaminated suspended sediments
- Tank Removal: This action consists of fluid storage tank sampling, content evacuation and disposal, and decontamination and disposal of tanks that are no longer required
- Buildings 865, 883, 444, and 447 IHSS Closure: This action consists of the accelerated closure of various IHSSs within these buildings
- Pad and Sump Removals: This action consists of the removal of contaminated concrete pads and sumps that are no longer in use and are not required for future activities
- Groundwater Intercept and Treatment: This action consists of the installation and operation of wells, pipelines, and treatment systems as necessary to contain groundwater contamination on the site

APPENDIX F

COST AND SCHEDULE ASSUMPTIONS AND BASIS

Introduction

The Revised ER Approach contains elements of many efforts to improve the efficiency of cleanup at the Rocky Flats Plant (RFP). The main objectives of those efforts have been to accelerate the ER Program, minimize life-cycle costs, and execute the program in the most cost effective manner. The following provides a summary of the key assumptions and cost and schedule factors utilized in the development of the preliminary costs, schedules, and resultant savings associated with this revised approach:

Evolution from Current Conditions

The "Current Conditions" scheduling database (developed to support the FY95-99 EM-40 Baseline document dated June, 1993) was used as a starting point for the Revised ER Approach. The Current Conditions database was prepared to reflect the current ER program requirements, activities, and durations based on lessons learned while performing actual work at RFP. The ER program has changed substantially since the signing of the Interagency Agreement (IAG) in January, 1991. The scope of work has increased, the process for accomplishing work at RFP has become more complex, and there have been difficulties in acquiring the environmental personnel required to execute the IAG.

Development of the Current Conditions database also prompted evaluation of many IAG processes and requirements to determine if they were reasonable and efficient. One of the most significant potential improvements identified was the concept of accelerating cleanup activities using available data and Interim Remedial Actions (IRAs) for Individual Hazardous Substance Sites (IHSSs), instead of automatically following the prescribed process for characterizing and evaluating entire OUs.

Utilizing this concept, the OU managers evaluated every IHSS and categorized it as potentially being a No Further Action (NFA), a Potential Early Action (PEA), traditional RI/FS, or linked to Transition/Decontamination & Decommissioning (T/D&D). The following briefly describes the above referenced categories:

- No Further Action (NFA) - Validated field characterization data proves that contaminant concentrations are not significantly above action levels.

- Potential Early Action (PEA) - Historical site data and/or validated field characterization results indicate that an IHSS is a candidate for a presumptive remedy or corrective action that would eliminate potential contaminant migration and reduce risk to the site workers and the public.

- Traditional RI/FS - IHSSs that are not candidates for either an NFA or PEA and are not located in the PA or in close proximity to major structures in the Industrial Area (IA) will remain on the traditional RI/FS schedule.

- Transition/Decontamination and Decommissioning (T/D&D) - Those IHSSs within the Protected Area (PA) where contaminants have low mobility, that are currently in or under buildings, or are logistically inaccessible are candidates for

deferral of complete investigation and corrective action until T/D&D activities are initiated.

Soil Treatment

For all IHSSs believed to require soil treatment, the following assumptions were made:

- Soils that contain only hazardous contaminants will require excavation, packaging, and immediate shipment to offsite disposal facilities.
- Soils containing mixed waste (hazardous and radioactive) will require onsite storage until the Nevada Test Site (NTS) is available to receive shipments (currently estimated at FY2000).
- 80% of the soil contaminated with mixed waste will be returned to the original site or other appropriate location after excavation and treatment. (Note: this assumes and will require acceptance of the Corrective Action Management Unit [CAMU] concept.)
- 20% of the soil contaminated with mixed waste will require onsite or offsite storage after excavation and treatment. (Note: if Land Disposal Restrictions [LDR] apply to the residual waste, further treatment may be required. It is necessary that integration occurs with the RFP Site Treatment Plan under the LDR Federal Facilities Compliance Act [FFCA][1].)
- Soils containing predominantly volatile organic compounds will be remediated by soil vapor extraction methods.

Isolation of contaminated areas within a specific IHSS will reduce risk of migration and will minimize soil volumes to be treated by using a vegetation soil cap. This approach would accelerate cleanup without compromising the risk to either the public or the environment.

The key assumption affecting disposal volumes is that the majority of excavated soils characterized as Low-Level Mixed waste will be treated by soil washing technologies. This is a proven treatment approach applicable to the type of soil and contaminants (primarily metals and radionuclides) present at RFP resulting in a considerably lower disposal requirement than most proven solidification technologies.

It is estimated that this approach would result in categories and volumes of soil shown in Table F1.

These preliminary estimates of soil volume to be treated under the Revised ER Approach represent an effort to isolate the contamination at the source by providing interim removal actions. This would be accomplished by initiating IM/IRAs for an individual IHSS, portion of an IHSS, or group of similar IHSSs without having to wait for a Record of Decision (ROD) to implement a corrective action. In addition, implementation of the IM/IRAs should reduce cost

[1] No additional costs for re-treatment have been included.

and schedule requirements of remaining RI/FS activities by lessening the work scope and the complexity of the study. It should be noted, however, that some of this minimization will be offset by requirements necessary to implement early actions.

Table F1
Soil Volumes

Soil Volumes (cubic yards)						
Operable Units	Waste Type			Soil Washing (Mixed Waste)		Soil Vapor Extraction
	Hazardous	Rad	MW	Clean Fill (80%)	Ship or Retreat (20%)	
1	13,889	0	0	0	0	15,333
2	0	0	71,778	57,422	14,356	Trench
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	17,440	0	0	0	0
6	0	0	51,565	41,252	10,313	0
7	5	0	0	0	0	0
8	2,981	21,552	10,871	8,697	2,174	500
9	0	0	71,334	57,067	14,267	0
10	182	99,073	671	537	134	0
11	0	0	0	0	0	0
12	0	75	390	312	78	0
13	17,962	205	4,835	3,868	967	8,500
14	0	8,150	37,591	30,073	7,518	0
15	0	0	0	0	0	0
16	0	0	0	0	0	0
Total	35,019	146,495	249,035	199,228	49,807	24,333
Expansion Factor (x 1.4)	49,027	205,093	348,649	278,919	69,730	34,066

Schedules

Using the current conditions schedules as a baseline, potential remedies, process logic, and preliminary schedules were developed for the NFA and PEA candidates. All IHSSs linked to the completion of D&D or the traditional RI/FS process did not require schedule revisions. Tanks in IHSSs which should be linked to T/D&D will be emptied, washed out, and left as part of future T/D&D (OU 9's IHSSs 146.1 - 146.6 and 215).

For OUs 1, 2, 3, 5, and 6, the RFI/RI field investigations are essentially completed, so the NFA or PEA process could begin after the review of the validated field data as shown in Table F1.

OUs 15 and 16 have initiated No Further Action Justification Documents and OU 16 is preparing a ROD. OU 4 and 7 are combining Phases I and II to accelerate action. For the other OUs (8, 9, 10, 11, 12, 13, and 14) the data needed to confirm the viability of an NFA or PEA could be generated by a Limited Field Investigation (LFI) as shown in Figure 2. The resultant risk reduction from each early action IM/IRA would be reflected in the corresponding OU's Record of Decision and determination of an appropriate final disposition.

The timing for implementing candidate NFAs and PEAs is contingent on agency approval. Key assumptions include:

- The process and requirements for determining a candidate NFA will be approved by the regulatory agencies and DOE by June 1, 1994.
- An IM/IRA Decision Document for the implementation of PEAs will be approved by October 1, 1994.

By aggressively pursuing the Revised ER Approach, it is projected that Decision Documents for the following early actions could be submitted according to the schedule shown in Table F2.

Table F2
Comparison of
Early Action Decision Documents vs. OU RODs

OU	SUBMIT NFA DECISION DOCUMENT TO AGENCIES	SUBMIT PEA DECISION DOCUMENT TO AGENCIES	ROD
1	5-May-95	6-Apr-95	4-May-99
2	6-Apr-95	6-Apr-95	22-Apr-99
3	6-Apr-95	6-Apr-95	10-Feb-99
4			
5	20-Jun-96	20-Jun-96	3-Jan-01
6	6-Apr-95	6-Apr-95	15-Jun-00
7	6-Apr-95	6-Apr-95	31-Jul-00
8	21-Apr-95	21-Apr-95	30-Oct-94
9		21-Apr-95	4-Mar-08
10		21-Apr-95	15-Jul-20
11		21-Apr-95	
12	21-Apr-95	21-Apr-95	4-Jan-99
13	21-Apr-95	21-Apr-95	11-May-04
14		21-Apr-95	6-Apr-14
15	21-Apr-95		
16	29-Nov-94		

Cost Estimates

Preliminary cost estimates were developed by IHSS for each potential accelerated remedial action according to the prospective remedy that was assigned after taking into consideration suspected or known contaminant characteristics, the type and extent of work performed under remedial investigations, and the availability of appropriate remediation technologies. Each prospective remedy was evaluated to determine unit rates, taking into account historical cost and schedule data associated with remedial activities at RFP and other local contaminated sites. The unit rates were then applied to each PEA candidate to develop cost estimates based on the volume, size, and quantity of the suspected contaminated media.

Assumptions utilized when estimating costs for the Revised ER Approach include:

Historical averages for actual activities were used as a basis for estimating NFA and PEA activities (see Table F3).

Cost estimating factors for the cost of excavating, analyzing, processing, and boxing of the soils from an IHSS to a treatment facility and the cost of treatment, shipment, storage, and disposal are shown in Table F4.

Conclusion

The Revised ER Approach has identified a means to accelerate ER activities, minimize the total life cycle costs of the program, and execute the program in the most cost effective manner. This approach provides a realistic funding profile that is targeted at early and tangible achievements versus extensive studying prior to initiating action.

The success of implementing this revised approach is dependent on the ability to dispose of ER generated wastes. Interim onsite storage capabilities will be required pending offsite availability. Construction of two 100,000 cubic yard capacity RCRA-compliant storage cells has been factored into the Revised ER Approach cost, schedules, and assumptions. Regulatory agreement on key enabling features such as CAMU designations and/or regrouping of the current OU boundaries will be necessary to allow for efficient consideration and provision of adequate interim storage capacity. All stored wastes would be retrievable upon determination of a final disposition consistent with the end use of RFP.

The data for these cost and schedule estimates were developed during the summer of 1993; a re-evaluation of the IHSSs is now underway. Fieldwork in OUs 1, 2, 3, 5, 6, and 7 is complete; and OUs 8, 9, 10, 12, 13, and 14 began their fieldwork activities in January 1994. With the benefit of actual fieldwork results, the next iteration of cost and schedule estimates will offer a more accurate picture of anticipated ER Accelerated Cleanup costs and schedules. This evaluation will re-categorize the IHSSs using more accurate information on soil volumes, type of contaminants and their concentrations, prospective remedies, etc. It will also reflect a revision to the strategy for using IM/IRAs. Current thinking is that in order to expedite processing and approval of similar PEAs it may be more efficient to write and obtain approval of a generic IM/IRA for each of several key types of PEAs.

Table F4

ER Accelerated Cleanup
Generic Resource Requirements

DESCRIPTION	DURATION CUR/STRAT	COST CENTER	COST ELEMENT	QTY CUR/STRAT	TYPE
POTENTIAL EARLY ACTION (PEA)					
EVALUATE DATA	20	0202	750	4	L
		0243	750	2	L
		0249	A5H	16000	T
		0249	750	16	L
LETTER OF INTENT	20	0202	750	0.25	L
		0205	750	0.15	L
		0243	750	1	L
		0249	750	0.5	L
PEA DECISION DOCUMENT	41	0243	750	82	T
		0336	750	20	T
		0249	750	82	T
		0243	A5H	3000	T
		0249	A5H	16000	T
REVIEW & APPROVE PEA DECISION DOCUMENT	65	0243	750	0.5	L
PEA PROCUREMENT	20	0202	750	1	L
		0205	750	1	L
		0243	750	3	L
		0249	750	1	L
		0248	750	3	L
		0336	750	3	L
		0355	750	1	L
		3021	750	1	L
CHEM HOOD DEMO DESIGN	120	0243	750	4	L
		0249	750	15	L
		0249	A5H	140000	T
		0282	750	6	L
		0336	750	12	L
		0425	750	4	L
		0441	750	1	L
REMEDIAL ACTION PEA SOW/NEGOTIATIONS	20	0355	750	0.11	L
		0243	750	1	L
		0248	750	0.11	L
		0249	750	4	L
		0249	A5H	5000	T
		0336	750	5	L
OBTAIN PERMITS & MOBILIZE FOR PEA	20	0205	750	0.63	L
		0243	750	2	L
		0249	750	2	L
		0249	A5H	26000	T
		0371	750	2	L
		0409	750	2	L
		0425	750	2	L
		0441	750	4	L
		1395	750	0.81	L
COMPLETION REPORT	100	0202	750	112	T
		0243	750	622	T
		0243	A5H	122000	T
		0249	750	89	T
		0205	750	66	T
PEA RCRA CAP DESIGN	120	0243	750	4	L
		0249	750	15	L
		0249	A5H	600000	T
		0282	750	6	L
		0336	750	12	L
		0425	750	4	L
		0441	750	1	L
POTENTIAL EARLY ACTION	VAR	0243	750	0.25	L
		0249	750	0.5	L
		0249	A5H	VAR	T
		0379	750	0.5	L
		0425	750	0.25	L
		0441	750	1	L

Table F4

ER Accelerated Cleanup
Generic Resource Requirements

DESCRIPTION	DURATION CUR / STRAT	COST CENTER	COST ELEMENT	QTY CUR / STRAT	TYPE
LIMITED FIELD INVESTIGATION (LFI)					
REVISE LFI WORK PLAN	20	0202	750	0.3	L
		0205	750	2	L
		0243	750	8	L
		0249	750	8	L
		0243	A5H	50000	T
REVIEW & APPROVE LFI WORK PLAN	20	0243	750	2	L
LFI PROCUREMENT	20	0202	750	1	L
		0205	750	1	L
		0243	750	3	L
		0249	750	1	L
		0248	750	3	L
		0336	750	3	L
		0355	750	1	L
LIMITED FIELD INVESTIGATION	120	0202	750	VAR	T
		0243	750	VAR	T
		0243	A5H	VAR	T
		0243	A5C	VAR	T
		0409	750	VAR	T
		0425	750	VAR	T
		0441	750	VAR	T
		3003	A5H	VAR	T
NO FURTHER ACTION (NFA)					
NFA DECISION DOCUMENT	41	0243	750	82	T
		0336	750	20	T
		0249	750	82	T
		0243	A5H	3000	T
		0249	A5H	16000	T
REVIEW & APPROVE NFA DECISION DOCUMENT	65	0243	750	0.25	L

Table F4
Soil Treatment Cost Table

Soil Treatment	Cost	Unit
Hot Spot Removal		
Labor & Materials	$25,000.00	Hot Spot
Capping	$50,000.00	acre
Excavation & Loading		
Equipment & Materials	$7.36	cubic yard
Labor:		
Buffer Zone	$13.12	cubic yard
Within Fenceline	$13.84	cubic yard
Protected Area	$14.14	cubic yard
Offsite Disposal		
Excavation, Processing, & Analysis	$625.00	cubic yard
Boxing	$317.00	cubic yard
Transportation Costs	$259.00	cubic yard
Disposal Costs	$365.00	cubic yard
Soil Vapor Extraction		
Construction Management, Design, Equipment, & Materials	$42.60	cubic yard
Labor:		
Buffer Zone	$47.40	cubic yard
Within Fenceline	$51.62	cubic yard
Protected Area	$52.91	cubic yard